

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—25TH YEAR.

SYDNEY, SATURDAY, NOVEMBER 19, 1938.

No. 21.

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NON-SURGICAL DRAINAGE OF THE ALIMENTARY TRACT: LYON'S TECHNIQUE.¹

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THE title "non-surgical drainage by Lyon's technique" usually refers solely to biliary drainage; but I have purposely made the title of this paper "Non-Surgical Drainage of the Alimentary Tract" because I wish to refer to drainage of toxic substances from the whole tract. In this, biliary drainage forms an important part.

¹ Read at a meeting of the Victorian Branch of the British Medical Association on May 28, 1938, at Horsham.

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Max Jutte,⁽¹⁾ under the title "Transduodenal Lavage", has described its use for a similar reason in chronic intoxication; I shall refer to Jutte's work later. More recently Ian Wood,⁽²⁾ of the Walter and Eliza Hall Institute of Research in Pathology and Medicine, has brought the technique of continuous stomach drainage before our notice in *The Australian and New Zealand Journal of Surgery*, of April, 1938.

Research in General Practice.

Sir James MacKenzie⁽³⁾ wrote concerning medical research that: "The progress of medicine will be hampered and delayed until the general practitioner becomes an investigator." In these days of elaborate equipment and expensive laboratories, the rôle of the general practitioner in research appears infinitesimal. However, if (with such simple equipment as a rubber tube and a few bottles and

chemicals and a microscope) the general practitioner, isolated from the centres of scientific progress and activated by the spirit of adventure, is stimulated to the further investigation of non-surgical drainage, I shall feel that this paper has not been in vain. Such research in the future may first appear in the provincial clinics and later amongst the individual practitioners. I fully realize my shortcomings in dealing with this subject; my experience with the method is general, and I have only a limited number of cases for reference. Nevertheless I have reviewed the literature from many sources and have attempted to give a comprehensive and interesting account of the subject for your discussion, particularly from the general practitioner's point of view.

Historical.

The history of non-surgical drainage dates back to the days of Celsus,⁽⁴⁾ who wrote thus:

If the stomach is filled with phlegm a vomit is necessary, sometimes in one, fasting, sometimes after food. If the food is not retained, water is to be given, and fuller vomiting elicited and food to be given again.

Further, in writing on the diseases of the intestines, he wrote:

To clyster the bowels is best if the disease is below the navel.

Sailing was also recommended by Celsus as being useful in diseases of the stomach. One imagines that the benefit of the cure was by virtue of the vomiting induced. Natural drainage of the alimentary tract by clysters and purging has for years taken a prominent part in the treatment of disease. From these ancient methods of stimulating natural drainage we pass to the invention of the stomach tube, which was suggested in 1797 by Dr. Alexander Monroe, junior, of Edinburgh, and brought into practical use by Dr. Physick, professor of surgery in the University of Pennsylvania in 1800. Dr. Physick's method was unknown at that time in Europe, and in 1822 two English surgeons, Jukes and Bush, described the use of a tube for removing poisons from the human stomach and also gases of fermentation from cattle. For some time these two surgeons enjoyed the credit of originality for the invention. The possibilities of the tube, or rather of the stomach pump, were fully realized in the cases of those who were indiscreet in their diet and those who exceeded their normal gastric capacity. Progress in the use of the stomach tube was slow during the next fifty years. In 1867 Kussmaul used a stomach tube for treatment and diagnosis; in 1871 von Leube used a stiff rubber tube; and finally, in 1875, Ewald introduced the soft rubber tube. In 1879 Dr. Schliep, of Germany, used the stomach pump in many affections of the stomach. He used pure water in cancer, bicarbonate of soda in conditions of acidity, potassium permanganate if fermentation was present, carbolic acid for vegetable parasites, boracic acid as a disinfectant, and tincture of myrrh in atonic dyspepsia with abundant secretion of mucus.

In 1881 Stephen Smith described the use of a stomach pump. The tube was passed through the central hole in a mouth gag. He also recommended that a quantity of water should be pumped into the stomach first and then pumped out; that is, he recommended lavage. This flute-keyed stomach pump was also recommended to be used as an aspirator or enema syringe, as the occasion demanded.

In the second edition of Pye's "Surgical Handicraft" (1885) we find mention of the siphon principle, which is used today instead of the pump.

After the methods of intubating the stomach had become familiar, it was realized that to carry the intubation through the pylorus would open up a new area, the duodeno-biliary zone, with extensive possibilities of investigation. The duodenum was first successfully intubated by Hemmeter, of Baltimore, in 1895, who used an inflatable rubber balloon attached to the end of the stomach tube. Hemmeter's work was followed by Kuhn and Turck; but it was not until 1909 that Einhorn developed the first of the modern duodenal tubes with the metal tip. Maurice Gross (1910) was the first to use the principle of gravity by weighting the tube and placing the patient on his right side, so that the tube would be carried through the pylorus.

In 1933 O. H. Wangenstein and I. R. Paine⁽⁵⁾ described a method of duodenal drainage by means of continuous hydraulic suction. Various modifications in duodenal tubes have been made, but mainly they differ merely in the size or shape of the tip (Figure 1).

In an excellent article in *The American Journal of the Medical Sciences*, April, 1917, S. J. Meltzer⁽⁶⁾ propounded the general law of contrary innervation in its application to the gall-bladder and the sphincter of Oddi. He also showed that local application of a 25% solution of magnesium sulphate on the duodenal mucosa caused local relaxation of the intestinal wall. He made the suggestion, in a footnote, that the local application of magnesium sulphate should be tested in cases of jaundice and biliary colic. It was from this suggestion that Lyon formulated his method of non-surgical biliary drainage, which is sometimes termed the Meltzer-Lyon method. Meltzer discovered that the relaxation of the intestinal wall did not take place if the magnesium sulphate was previously passed through the stomach, although, more recently, J. W. McNee⁽⁷⁾ has stated that the same action does occur if the magnesium sulphate is administered on an empty stomach.

The Lyon Technique.

The method described by Lyon⁽⁸⁾ is a formidable procedure of details; I shall give only a brief summary of it here, and refer those who are interested to Lyon's original description.⁽⁹⁾

The most satisfactory time for performing a diagnostic drainage is in the morning, the patient having taken no food. The mouth is next disinfected and any artificial dentures are removed. The tube is passed to the 55-centimetre mark from

the tip, and the patient's reaction to the tube is noted. The fasting gastric residuum is then removed, its characteristics are noted and an analysis is made. Gastric lavages, and disinfection if cultures are to be made, are given until the fluid is clear. Then 150 cubic centimetres of water are injected, to facilitate the passage of the tube through the pylorus.

The end of the tube is now clamped and the patient is turned onto the right side, swallowing the tube slowly until the 75-centimetre mark reaches the teeth. This takes about twenty minutes. The position of the tube is then tested in the following ways: (i) the acidity is tested, except in *achylia gastrica*; (ii) air is injected through the tube, and the epigastrium and right hypochondrium are auscultated; (iii) examination by means of the fluoroscopic screen is made.

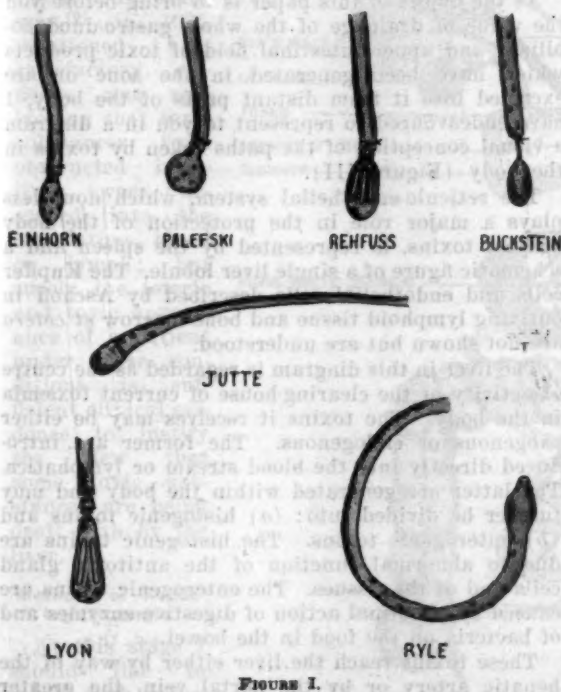


FIGURE I.

The tube is then connected to the bottle and the duodenal residuum is drained off. An increase in bile flow is induced by means of a 33% solution of magnesium sulphate, peptone solution, olive oil or oleic acid. The bile fractions (Figure II) are then collected, cultures are made, and the bile fractions are examined grossly and microscopically.

Next, with the patient in the sitting position, duodenal lavage is performed with a suitable disinfectant, and then a duodenal enema of Ringer's solution is given. The tube is withdrawn to the stomach mark and gastric lavage is again performed. The tube is then removed and the patient is allowed to rinse his mouth. He is given "Bovril" and crackers to eat.

The duration of the treatment is from two to six hours when intermittent drainage is being performed; but with continuous drainage the tube is allowed to remain *in situ* day and night for a period varying from several days up to as much as three weeks, with, on an average, two magnesium sulphate stimulations per day. To overcome the relaxing effect of the magnesium sulphate and restore the normal tonicity, about 3.9 grammes (one drachm) of sodium sulphate crystals may be added to the Ringer's solution.

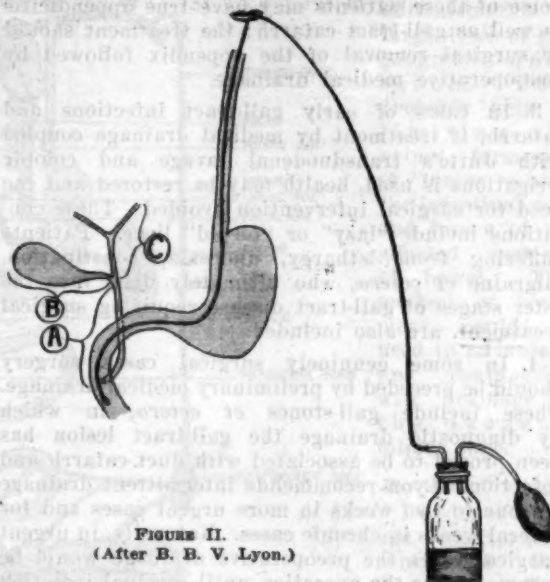


FIGURE II.
(After B. B. V. Lyon.)

Indications.

I propose here to describe briefly the usefulness of biliary drainage, either alone, or in combination with other procedures, both medical and surgical. It should be clearly understood that no claim is made that the method should replace surgical methods where these are indicated; but it should be used in medical cases in which only medical treatment is required, to act as an adjuvant treatment to surgical procedures.

In the matter of selection of cases for biliary drainage I cannot do better than roughly follow the classification given by Lyon. Excluding purely surgical cases, he considers that non-surgical drainage is indicated in the following cases.

1. In cases that might unquestionably be considered surgical, but in which there are such serious contraindications as not to justify the surgical or anaesthetic risk, non-surgical drainage may be used if it can be shown to be an adequate alternative. For example, it is useful in myocarditis, decompensated cardio-renal diseases, hepatic cirrhosis, nephritis, toxic hyperthyroidism, diabetes, haemolytic jaundice and extreme age or debility.

2. In borderline cases, formerly considered surgical, non-surgical drainage may be used if it seems that equally good or better results may be

obtained by medical drainage of the gall tract. These cases include that large number in which vague clinical histories with atypical symptomatology are presented, for example: functional dyspepsia, biliousness, nervous indigestion *et cetera*. In these an unsuspected gall-tract infection or catarrh is probably found. The patient of this class probably finally submits to laparotomy and the surgeon removes a relatively normal appendix or Jackson's membrane or fixes a mobile caecum and leaves behind an infected or catarrhal gall tract. Some of these patients may have true appendicitis as well as gall-tract catarrh; the treatment should be surgical removal of the appendix followed by post-operative medical drainage.

3. In cases of early gall-tract infections and catarrh, if treatment by medical drainage coupled with Jutte's transduodenal lavage and colonic irrigations is used, health may be restored and the need for surgical intervention avoided. These conditions include "lazy" or "torpid" liver. Patients suffering from lethargy, anorexia, constipation, migraine *et cetera*, who ultimately drift into the later stages of gall-tract disease requiring surgical treatment, are also included.

4. In some genuinely surgical cases surgery should be preceded by preliminary medical drainage. These include gall-stones *et cetera*, in which by diagnostic drainage the gall-tract lesion has been proved to be associated with duct catarrh and infection. Lyon recommends intermittent drainage for one to two weeks in more urgent cases and for several weeks in chronic cases. Naturally, in urgent surgical cases the preoperative drainage would be resumed after the operation until residual infection ceased to exist. This is a sensible combination of medical and surgical methods. A second important group of surgical cases in this class are those in which obstructive jaundice is the lesion. The jaundice and general toxæmia are lessened by drainage; consequently the severity of post-operative shock and complications is reduced.

5. In some genuinely surgical cases operation should be followed by medical drainage. This group partly overlaps the previous group; but medical drainage not only acts therapeutically, but also serves as a post-operative diagnostic test. Lyon states that he has cleared up many post-operative infections of the gall tract, and attributes the success of this method to the fact that in medical drainage we have an effective method of draining the liver itself and removing from the system many toxins, both bacteriological and metabolic.

6. The sixth group consists of essentially medical cases.

Catarrhal jaundice is an indication for non-surgical drainage. Its average duration is three to six weeks. Although it is regarded as a comparatively simple disease, it may possibly have important sequelæ, such as damage to the cells of the liver and pancreas. Lyon claims to have halved the duration of the disease by medical drainage, and in some

more favourable cases to have cleared up the condition in seventy-two hours.

In certain types of chronic progressive arthritis, in which all suspected primary foci have been removed without arrest of the disease, non-surgical drainage is of benefit. Not only may it remove a secondary focus of infection, but it may also break the vicious circle of reabsorption of toxins, metabolic and bacteriological, through the portal circulation from the excreted bile which is passed into the intestines.

Typhoid carriers may be freed from bile-tract infection by medical drainage alone, subsequent serious gall-bladder disease thus being prevented. Some of these patients, however, may require surgical treatment as well.

The Paths Taken by Toxins in the Body.

As the object of this paper is to bring before you the value of drainage of the whole gastro-duodenobiliary and upper intestinal field of toxic products which have been generated in the zone or are excreted into it from distant parts of the body, I have endeavoured to represent to you in a diagram a visual conception of the paths taken by toxins in the body (Figure III).

The reticulo-endothelial system, which doubtless plays a major rôle in the protection of the body against toxins, is represented by the spleen and a schematic figure of a single liver lobule. The Kupffer cells and endothelial cells described by Aschoff in outlying lymphoid tissue and bone marrow *et cetera* are not shown but are understood.

The liver in this diagram is regarded as the centre of activity or the clearing-house of current toxæmia in the body. The toxins it receives may be either exogenous or endogenous. The former are introduced directly into the blood stream or lymphatics. The latter are generated within the body and may further be divided into: (a) histogenic toxins and (b) enterogenic toxins. The histogenic toxins are due to abnormal function of the antitoxic gland cells and of the tissues. The enterogenic toxins are caused by abnormal action of digestive enzymes and of bacteria on the food in the bowel.

These toxins reach the liver either by way of the hepatic artery or by the portal vein, the greater number probably by the latter channel. When they have been dealt with by the cells of the reticulo-endothelial system the waste products are excreted through the medium of the bile into the principal excretory apparatus of the body, the intestines. Of course, many of the waste products are got rid of also by means of the kidneys; but these are not under consideration.

This intoxication of the liver may be either acute or chronic. The principal acute intoxications are paralytic ileus, eclampsia and acute yellow atrophy. It is in these conditions that non-surgical drainage of the duodeno-biliary zone produces a beneficial effect.

We are all familiar with the steady unremitting train of symptoms which arise when acute ileus

develops and which finally progress to a fatal issue. These were described by Celsus years ago, and recently by Dr. Ian Wood,⁽²⁾ so I will not repeat them here. It is easy to realize that in acute ileus one might delay drainage of the proximal part of the small intestine by means of jejunostomy until too late; and this would be more likely if one were isolated from ample assistance. The prompt passage of the duodenal tube, however, can be performed by anyone, even a nurse, and will serve the same purpose without dehydrating the patient or subjecting him to the shock of another operation.

Dr. C. H. Kellaway,⁽³⁾ in 1935, mentioned that satisfactory evidence was still lacking that toxic substances from obstructed intestines were absorbed into the circulating blood or lymph; but surely the icteric and toxic appearance of a patient under these conditions is sufficient clinical evidence to justify the view that some toxic substances are being dealt with by the liver.

Methods of Reducing Toxaemia.

At this stage I should like to recall with reference to the diagram some of the various methods used in recent years in an attempt to reduce the toxæmia arising from intestinal obstruction and peritonitis, all of which probably owe their success to the release of toxic substances from the liver. The first is jejunostomy. Although this may drain away the toxins and relieve distension, it necessitates further surgical shock and dehydrates the patient.

The second method is Sampson Handley's⁽¹⁰⁾ enterocolostomy combined with enterostomy; or, as J. W. Long,⁽¹¹⁾ of North Carolina, has so aptly called it, "intestinal plumbing". This prevents extreme dehydration and offers avenues for drainage

of toxins as well as for relief from distension; but it still necessitates further surgical shock.

The third is Costain's⁽¹²⁾ lymphaticostomy. Although this acts as an outlet for toxins passing from the bowel to the liver by way of the thoracic duct, its use has not been generally accepted. It deprives the patient of most of the chyle as well as the toxins, and the results have not been uniformly satisfactory.

The fourth method is the administration of large doses of gangrene antiserum. This probably acts by limiting the actual formation of toxins within the intestinal wall and lumen of the affected segment of bowel. This method of treatment could be used to advantage in conjunction with drainage of the duodenobiliary zone.

Duodenal Drainage.

Duodenal drainage, or better still, continuous duodenal suction, offers a method of overcoming the chief causes of the high mortality rate which still exists in acute ileus. Its chief advantages are: (i) the relief of distension, (ii) the replenishing of dehydrated tissues, (iii) the minimizing of toxic absorption, (iv) the replacement of mineral salts by the administration of Ringer's solution.

Having referred to the use of duodenal drainage in acute ileus, I could hardly leave this subject without some reference to that great American surgeon John B. Murphy and his valuable contribution to modern surgery, proctoclysis. It would be superfluous to state that proctoclysis would be used as a matter of course with any of the previous methods of treatment in acute ileus, because the principle of the method stands as firmly today as when it was introduced.

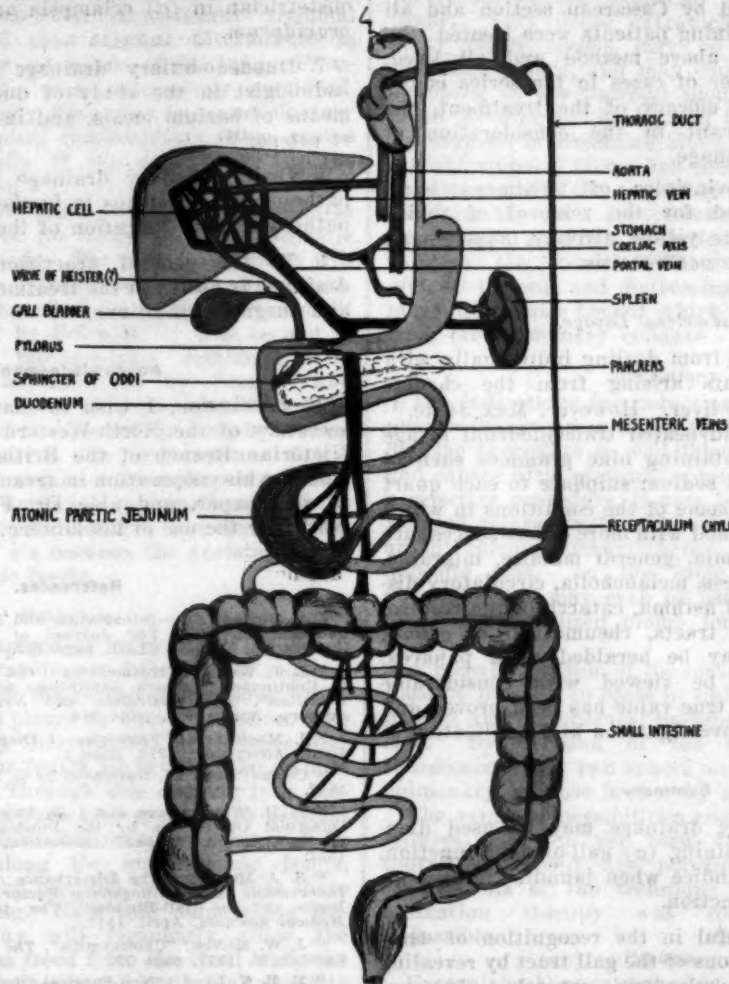


FIGURE III.

In eclampsia Howard F. Kane,⁽¹³⁾ of Washington, and others, emphasize the value of stomach lavage continued until clear fluid is returned. It should be followed by the introduction of 30 grammes (two ounces) of magnesium sulphate solution (which would undoubtedly drain the liver). This is also associated with colonic irrigations, 22.7 litres (five gallons) of fluid being used. Of thirteen patients treated and described by this observer, three were delivered by Caesarean section and all died. The ten remaining patients were treated conservatively by the above method and all lived. Although the number of cases in the series is too small to prove the efficacy of the treatment, the results are significant in the consideration of duodeno-biliary drainage.

The foregoing principles of treatment could similarly be applied for the removal of toxins responsible for acute yellow atrophy, *hyperemesis gravidarum* or acute pancreatitis.

Transduodenal Lavage.

Time prevents me from dealing individually with the chronic ailments arising from the chronic intoxications of the liver. However, Max Jutte,⁽¹⁾ of New York, has advocated transduodenal lavage with a solution containing nine grammes each of sodium chloride and sodium sulphate to each quart of water. Amongst some of the conditions in which he has used this method with more or less success are the following: anaemia, general malaise, migraine, neuralgia, nervousness, melancholia, circulatory disturbances, bronchial asthma, catarrh of the respiratory and digestive tracts, rheumatism *et cetera*. Such a method may be heralded as a panacea, but will probably be viewed with considerable scepticism until its true value has been proved and tested by further investigations and application.

Summary.

1. Duodeno-biliary drainage may be used diagnostically in determining (a) gall-bladder function, (b) the type of jaundice when jaundice is present, and (c) hepatic function.

2. It may be useful in the recognition of early pathological conditions of the gall tract by revealing the presence of cholesterol crystals, abnormal epithelium, or bacteria in the bile fractions; it may also be useful in aiding recognition or in corroborating the presence of a stone in the gall tract by revealing the presence of cholesterol crystals or bile pigments.

3. Duodeno-biliary drainage may be used therapeutically in the treatment of several conditions. Familiarity with its practice and application should be sought before judgement is passed.

4. Duodeno-biliary drainage is of value to the surgeon in (a) diagnosis; (b) preoperative and post-operative treatment; (c) acute ileus, peri-

tonitis, obstruction *et cetera*; (d) inoperable conditions.

5. Duodeno-biliary drainage is of value to the physician in (a) diagnosis, (b) the treatment of catarrhal conditions of the gall tract, (c) certain chronic intoxications, and (d) the treatment of typhoid carriers.

6. Duodeno-biliary drainage is useful to the obstetrician in (a) eclampsia and (b) *hyperemesis gravidarum*.

7. Duodeno-biliary drainage is an aid to the radiologist in the study of duodenal function by means of barium meals, and in cases of distortion *et cetera*.⁽¹⁵⁾

8. Duodeno-biliary drainage is of value to the pathologist as a means to further physiological and pathological investigation of the alimentary tract.

9. To the general practitioner duodeno-biliary drainage is useful in the treatment of many medical and surgical conditions.

Acknowledgements.

In conclusion, I wish to thank Dr. G. Forsyth, secretary of the North-Western Subdivision of the Victorian Branch of the British Medical Association, for his cooperation in arranging for the reading of this paper, and also Dr. F. G. Middleton, of Nhill, for the use of his lantern.

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EXTRAPLEURAL ARTIFICIAL PNEUMOTHORAX.

By ALAN H. PENINGTON, M.D.,

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THE complete closure of tuberculous cavities at the apex of the lung is a "consummation devoutly to be wished", but notoriously difficult to attain. It is in this region particularly that pleural adhesions minimize the efficacy of intrapleural artificial pneumothorax, and that surgical interference is required to produce relaxation of the lung. Plombage and apicolysis were successively employed, but have been largely discarded as unsatisfactory procedures; and apical thoracoplasty often proves unavailing, especially if the cavities lie in the paravertebral region.

During the last five years two surgical procedures have been elaborated for which many enthusiastic claims have been made. The first, with which this paper deals, is the extrapleural artificial pneumothorax originally described by Graf, of Dresden,⁽¹⁾ and later modified by Schmidt.⁽²⁾ The second is known as apical thoracoplasty combined with apicolysis, and was described by Semb⁽³⁾ and Overholt.⁽⁴⁾ The purpose of these operations is to cause the collapse of the apex of the lung by freeing the parietal pleura or the endothoracic fascia from the chest wall and its surrounding structures. The extrapleural artificial pneumothorax is so called because the apical collapse is maintained by the introduction of air between the parietal pleura and the endothoracic fascia.

Procedure.

The surgical technique of induction of an extrapleural pneumothorax is not difficult, but requires an exact definition of the correct plane along which to strip the parietal pleura by blunt dissection. The thorax is opened by the resection of three or four inches of the third or fourth rib between the scapula and the vertebrae. Through this opening it is possible to define the extrapleural space. The parietal pleura is carefully dissected from the chest wall by blunt dissection along the endothoracic fascia, extreme caution being required to ensure that there is no undue bleeding. Slow and painstaking dissection in this way will frequently allow the parietal pleura to be freed from the chest wall, the cupola and the mediastinum, until the requisite amount of collapse is obtained. The freed portion of the lung readily retracts toward the hilum, and unless forced expiration by the patient takes place, will not obstruct full vision of the operative field. The wound is closed without drainage when satisfactory collapse is obtained, though Graf originally provided for drainage of the cavity during the first few days.

Immediately after closure of the wound a pneumothorax needle is inserted into the extrapleural space, and air is introduced until the mean pressure is in the region of five centimetres of water. If much surgical emphysema occurs after

the operation, it may be necessary to refill the space on the day of operation; otherwise the pressure is maintained by refills on the first and third days, and subsequently at weekly intervals. A small amount of fluid is always formed in the space after the operation, and may be detected on the first day; but it rarely requires aspiration.

The difficulties in induction of an extrapleural pneumothorax are not technical, but arise from the variations in the character of the extrapleural tissue. Very dense extrapleural adhesions with many blood vessels may be associated with a thickened pleura, and may constitute a bar to the stripping of the parietal pleura. When there is much bleeding at the time of the operation, either the surgeon is dissecting along the wrong plane, or the extrapleural tissue has become so fibrosed that persistence with the operation may result either in the formation of a broncho-extrapleural fistula, an extrapleural purulent collection, or a sinus opening through the wound. These complications are difficult to treat and distressing to the patient, and may nullify any benefit which might have accrued from the pulmonary collapse.

Indications.

The indications for induction of an extrapleural pneumothorax are similar to those for apicolysis, but the procedure is well tolerated by the patient and causes little systemic upset. Therefore, as it is a selective procedure, it may be used as a form of isolated relaxation therapy or in combination with an intrapleural pneumothorax on the same or the opposite side. In the same way, extrapleural pneumothorax may even be used bilaterally, or in place of a localized plomb for other than apical disease.

A recent extension of the technique has been practised by Brock⁽⁵⁾ in cases in which there is an extrapleural and intrapleural pneumothorax on the same side. By division of the septum through a thoracoscope, the two spaces may be joined, and the pulmonary collapse is thereby made complete.

The range of possibilities suggested by such procedures has not yet been fully explored; but thoracic surgeons are pointing out many new applications of the technique in cases in which relaxation therapy was formerly considered impossible.

Results.

Extrapleural pneumothorax has not yet been generally adopted in the therapy of pulmonary tuberculosis, and too short a time has passed for us to form a balanced opinion as to its value. However, Roberts⁽⁶⁾ has published his results in 32 cases observed over varying periods. Of his series, 25 patients are well, 18 have closed cavities, 4 have cavities which are diminishing in size, and 3 have open cavities, but are improved in general health. Four patients died within four months of the operation; and in three cases the procedure was abandoned.

These results do not appear to be greatly in advance of those obtainable by thoracoplasty; but,

owing to the slight degree of shock it produces, the operation has been employed when thoracoplasty was contraindicated. The final result of treatment cannot yet be determined, but some of the results are certainly dramatic.

Clinical Records.

CASE I.—C.D., a male, aged twenty years, was admitted to the Surrey County Sanatorium in May, 1931. He had been ill for several months, and complained of cough and sputum. An examination of his chest revealed an area of tuberculous infiltration at the apex of the left lung. His sputum contained tubercle bacilli. After observation for a period, a left-sided artificial pneumothorax was induced. He was discharged from hospital in December, 1931, with instructions to report for fortnightly refills.

During 1932 the pneumothorax showed signs of obliteration, and he was readmitted to hospital and phrenic evulsion was performed. He remained well, and returned to clerical work in the latter months of that year. Unfortunately a relapse occurred; and at the time of his readmission in September, 1935, there was evidence of bilateral disease. Considerable improvement resulted from rest in bed, though the sputum still contained tubercle bacilli and there was persistent cavitation at the apex of the left lung. Relapse resulted as soon as the patient carried out any exercise, and the sputum consistently contained tubercle bacilli. In November, 1937, it was decided to induce an extra-pleural pneumothorax on the left side, as the foci in the right lung appeared inactive (Figure I). The post-operative course was normal (Figure II), and he has maintained a steady improvement. He is now free from sputum, doing Sanatorium grade work, and states that he has not been so well for years. The apical cavitation is now obliterated (Figure III).

CASE II.—N.T., a female, aged thirty-eight years, was admitted to the Surrey County Sanatorium in June, 1937. Her illness dated from 1929, when she contracted pulmonary tuberculosis. As the disease was localized to the left lung, a left-sided artificial pneumothorax was induced in 1930, but obliteration occurred and it was abandoned in 1932. She still had a very troublesome cough, with copious sputum, and stated that she was never well.

Extension of the disease took place, and in 1936 a right-sided artificial pneumothorax was induced. Despite satisfactory relaxation of the right lung, she still had repeated hæmoptyses and her cough caused her much discomfort. A large, thick-walled cavity was present at the apex of the left lung (Figure IV). It was decided to induce an extra-pleural pneumothorax on this side while maintaining the pneumothorax on the right. This procedure was carried out in May, 1938, and the patient has made satisfactory progress to the present time (August, 1938). She is now free from sputum, has no cough, and states that she regards the operation as a complete success. (Figure V.)

CASE III.—H.R., a male, aged forty-one years, was admitted to the Surrey County Sanatorium in June, 1936. He had been suffering from pulmonary tuberculosis since 1932, but had managed to carry on his work as a cleaner until April, 1936, when he became acutely ill. At the time of his admission to hospital there was radiological evidence of disease in both lungs, the greater amount being on the left side. He was kept at rest under observation for nine months.

The right lung having improved, and there being extensive cavitation at the apex of the left lung, a left-sided artificial pneumothorax was induced in 1937. Although the base of the lung was well relaxed by the pneumothorax, the effect on the apex was not satisfactory (Figure VI), and it was decided to perform an extra-pleural pneumothorax on the adherent apex. This was done in January, 1938, and an uneventful convalescence followed. It is proposed that the extra-pleural and intra-pleural spaces may soon be joined to allow complete relaxation of the left lung (Figure VII).

Conclusions.

The full sphere of extra-pleural artificial pneumothorax in the treatment of pulmonary tuberculosis has not yet been determined, and the procedure has not been in use a sufficient time for us to evaluate correctly its place in therapy. However, it may be stated that the procedure often results in the concentric and complete closure of apical cavities in the lung, and many satisfactory results have been obtained by its use. On the other hand, the operation is not without risk, as the complications of broncho-extra-pleural fistula, infection and hæmorrhage into the space are not uncommon. Final judgement must, therefore, be withheld until definite indications for the operation have been elaborated and its contraindications have been determined. The indiscriminate use of the procedure in all cases of apical cavitation of the lung will merely result in the operation being brought into disrepute, and will thus conceal the true value of a new aid in the treatment of pulmonary tuberculosis.

Acknowledgements.

I wish to thank Dr. Allison, Medical Superintendent of the Surrey County Sanatorium, and also Dr. Price Thomas, Visiting Surgeon to the Sanatorium, for permission to describe the cases in this paper.

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SCHICK TESTING AND CARRIER RATES AFTER DIPHTHERIA IMMUNIZATION.

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As reported previously in *THE MEDICAL JOURNAL OF AUSTRALIA*,⁽¹⁾⁽²⁾ we have been immunizing children against diphtheria in the town of Hindmarsh since early in 1936. As occasionally immunized children had been affected in our district and in some other areas, it was thought worth while to try to determine the percentage of children who failed to react to the Schick test after treatment in 1936 and 1937. As is consistent with their previous

policy, the corporation of the town of Hindmarsh saw that the information was valuable and gave the work financial backing.

Results of the Schick Test in the Treated Group.

Conjointly with this year's immunizing campaign, we tested a number of children who had been treated in the previous two years. Table I shows the number of children inoculated each year and the dosage received by them. All the children were inoculated on the same day as nearly all the untreated 216 mentioned below; there were 524 all told.

TABLE I.
Number of Children Inoculated and Dosage.

Number of Children.		Dose Received. (Cubic Centimetres.)
1936.	1937.	
258	46	2.5 ¹
8	3	1.5 (two injections)
8	2	0.5 (one injection)
1	0	2.25
0	1	2.1
5	1	2.0
0	1	1.8
0	1	1.6
1	1	1.25
0	6	1.2
0	1	1.1
0	1	1.0
0	1	0.6
5	0	0.52
1	1	0.2
0	2	0.02
Totals .. 287	68	

¹ Full treatment of three injections at intervals of three weeks.

This group of children was entirely unselected. They applied for testing as a result of an appeal made to the general population of the town. Together with these children, 216 applicants for treatment this year were also Schick tested, these children having had no previous artificial immunization. One hundred and eighteen or 54.6% of these children gave a positive reaction. Only two of the previously treated children gave a reaction; the reaction in these two was of a very doubtful nature. For the purposes of calculation, however, they have been counted as reactors to the Schick test. In 1936, when over 1,200 children presented themselves for treatment, the administrative difficulties of arranging Schick testing, as well as Moloney testing, and the general procedure of immunization were too great for the limited staff available. Schick testing was carried out on a number of children who reacted to anatoxin; and in 1936 the whole of 55 of these failed to react. In 1937 seven others, who had reacted similarly, failed to react. As I mentioned in the paper I read before the Australasian Medical Congress (British Medical Association) in 1937,⁽²⁾ our experience among a group of medical students was similar; so that in all cases up to that time, when a person had a severe reaction after the administration of anatoxin, that person was found to be no longer susceptible to diphtheria, if the Schick test was taken as a criterion of susceptibility. Some exceptions have been found

since; and it now appears that this finding can apply only to children who have already had contact with diphtheria toxin.

Factors in the Schick Conversion Rate.

If we take the 216 untreated children tested this year as a control group, it is probable that 194 out of the 355 treated children tested were originally susceptible. If our two doubtful reactors amongst the treated group are regarded as having reacted, then the conversion rate is 98.9%. But 287 of these children had been given anatoxin for two years previously, and 68 had received it one year previously. This result can be regarded as very valuable evidence of the efficacy of the Commonwealth Serum Laboratory's anatoxin, particularly since most of the Schick testing carried out after immunization campaigns is performed at an interval much shorter than in this case. Reference to the literature on this question shows that in the majority of cases the test is made from three to six months after treatment, although Adey⁽³⁾ reports the results of Schick testing two years after treatment. Since the immunity level in the blood takes as long as five weeks to reach its maximum and thereafter falls at various rates, and since it takes on an average sixteen weeks to reach the level at which it remains nearly permanent (Dudley, May and O'Flynn⁽⁴⁾), those tests carried out within three months frequently strike subjects whose antibody level has not fallen to its static condition.

The Development of Immunity.

Last year an attempt was made to ascertain whether the spacing of doses of anatoxin at intervals of five weeks would give a higher conversion rate than the ordinary three weeks' interval adopted in the Hindmarsh series. Of 56 children at the Largs Bay Orphanage who had reacted to the Schick test, 42 were tested after treatment. One child, who had had three injections, gave a very weak positive reaction, three gave a moderate reaction and one a slight reaction. In no case had these children had a complete dosage. Two of them had had one injection of 0.5 cubic centimetre of anatoxin, and the others who gave a reaction from anatoxin had received respectively 1.51 cubic centimetres, 1.5 cubic centimetres and 0.61 cubic centimetre of anatoxin. Consequently it can be seen that, although a conversion rate of 90% was obtained by this means, the interval of five weeks tried in this limited series, which gave very variable results, is not to be advised. It must be borne in mind that in an institution where a rigid system of isolation exists before newcomers are admitted to the general herd, the chances of developing a natural immunity would appear to be limited. Consequently, the opportunity to develop a primary stimulus, which would aid the development of an artificial immunity, would be more difficult to produce than would most likely be the case in the larger Hindmarsh series, where children attending the schools of the district were treated.

It was found in the Largs Bay Orphanage group that two children who were naturally immune had become susceptible when retested four months later.

One of these had been admitted to the Metropolitan Infectious Diseases Hospital, Northfield, on June 26, 1937, suffering from mild faucial diphtheria. He failed to react to the Schick test on August 12 and was readmitted to the Metropolitan Infectious Diseases Hospital on September 7. On this occasion his illness was not definitely diagnosed as diphtheria, and he reacted to the Schick test on December 9.

A similar phenomenon was observed on several occasions during the Schick testing at Hindmarsh. It would appear that these are examples of that very small group of children who are difficult to immunize in ordinary circumstances, but who apparently may not become very ill from diphtheria when they contract it. It is unlikely that the members of this group total more than 1%; in fact, amongst the group of 355 immunized children who were Schick tested after receiving anatoxin, no case was encountered.

An Intense Early False Schick Reaction Distinct from the Pseudo-Schick Reaction.

On three occasions, twenty-four hours after the administration of Schick toxin, a reaction was noted in all respects identical with an intense, fully positive Schick reaction as seen on the fourth day, and without any reaction at the site of injection of the control fluid; nor did the control fluid cause a positive reaction at any time. This false Schick reaction disappeared by the third day. This finding was first brought to my notice by a female member of the clerical staff of the Institution of Medical Science. Dr. Platt had given her three injections of anatoxin and was Schick testing her to ascertain the result. The test material was the undiluted product. I had not observed this on any occasion before the introduction of the diphtheria toxin diluted ready for use by the Commonwealth Serum Laboratories. Obviously the reaction is caused by some substance that is not in the heated fluid used for control purposes, and is apparently distinct from diphtheria toxin itself. It might be suggested that the gelatine used in the making of the diluent was the responsible factor, but for Professor Platt's case, besides lacking aromatic radicals, gelatine is non-antigenic.

Objections Offered by Opponents of Immunization.

Two ever-present difficulties are advanced by those who hesitate to introduce the procedure of immunization against diphtheria into a community. These two questions now appear to be the main cause for objection, since experience has shown that many of the others that were raised just a few years ago are no longer of any significance. The first of these is the thesis that by immunization of the community the carrier rate is increased amongst those who have been immunized, and they are rendered a possible menace to the unprotected fraction of the community. The second point related to the first is that these carriers may become more dangerous, because they may harbour more

virulent organisms than would ordinarily be the case. In fact, ever since the existence of the *gravis* strain of *Corynebacterium diphtheria* has been established, this boggy has been advanced by those who are afraid or unwilling to introduce immunization procedures.

Carriers in a Partly Immunized Population.

Fitzgerald, Fraser, McKinnon and Ross⁽¹⁰⁾ have shown that very extensive immunization in Canada has not increased the incidence of diphtheria nor the number of carriers. They state that in Hamilton, Ontario, a town with a population of 150,000, in 1936, there were no swabs from which *Corynebacterium diphtheria* could be grown in 3,949 examined. Our investigations over the last two years have shown that among contacts in detected cases of diphtheria or among technical carriers, the incidence of swabs from which the Klebs-Loeffler bacillus can be cultured in the immunized proportion of the population, which is approximately 41% of the child population, is nearly one-sixth of the total number. Swabbings were taken from the sixty pupils of one school during June, and only one carrier was detected amongst the children. During the last two months ten cases of diphtheria have occurred in the immediate neighbourhood of this school. Amongst the contacts of these patients only one immunized child was found to be a carrier, whereas four others, unimmunized, had *Corynebacterium diphtheria* in their throats or noses. Between August 1, 1937, and August 1, 1938, 331 individuals had their noses and throats swabbed. These persons were contacts of patients with diphtheria. Forty-six swabs harbouring the diphtheria bacillus were obtained. Eleven of these were from adults. Some came from people who were not ill; that is to say, the persons concerned were only technically suffering from diphtheria. One hundred and twenty-eight swabs were taken from children who had been treated with anatoxin; from six of these diphtheria organisms were cultured. Only one of these children was ill, and even this child was not considered to be suffering from diphtheria, but merely tonsillitis. Examination of swabbings obtained from the other five children, a few days later, revealed no diphtheria bacilli. If we allow for the deduction of adults and children who had been immunized, we find that 29 children from whose swabbings diphtheria bacilli were cultured were unimmunized, and were found among 99 individuals of immunization age. This shows that in a population of children of which over 40% have been immunized against diphtheria, the percentage ratio of carriers amongst the immunized against diphtheria, as compared with carriers among the unimmunized, in a twelve months' period may approximate 5:30. On the basis of our experience we can definitely say that immunization of the children in our district has not caused an increase in the carrier rate. From July 1, 1936, to August 16, 1938, there have been 61 cases of diphtheria, includ-

ing technical cases. Sixteen patients were adults or persons over the immunization age. Of the remaining 45 within the age of the immunized group, only three actually received anatoxin. The remaining 42 cases occurred among the approximate 59% unprotected.

Immunization and Increased Virulence.

There has been no evidence in our experience that immunization against diphtheria has tended to increase the virulence of *Corynebacterium diphtheriae*. Except for the one doubtful case, in not one of the 61 cases which have occurred since our first campaign has there been any evidence of the occurrence of the *gravis* type, although that type has been shown by Puckey⁽¹⁾ to exist in an unimmunized district seven miles away. She also mentions that the intermediate type had not been isolated at the Metropolitan Infectious Diseases Hospital, Northfield, where her original work was done. Recently, however, examples of this type have been discovered by her. Bender⁽²⁾ reported an investigation amongst immunized and unimmunized children in schools, and isolated 58 strains from carriers. Twenty-three of these carriers came from 2,793 immunized children (0.82%) and 35 came from 313 unimmunized children (11.18%). Amongst the immunized children three carriers harboured the *gravis* type; among the unimmunized five harboured this type. This does not indicate that the immunized population are any great danger to the unprotected. Frost⁽³⁾ reports two surveys of carriers and shows that there is a decline in the carrier rate associated with the time of immunization. He believes that artificial immunization is the main factor in reducing diphtheria morbidity.

It is not surprising that these reports should now become available; for with understanding of the manner of development of the immunity, these findings are only what would be expected. Active immunization against diphtheria produces only an antitoxic immunity, but not an antibacterial immunity. In individuals protected against diphtheria toxin, an infection readily produces an antibacterial immunity without causing, in the majority of cases, any illness; nor does the infection persist unless some pathological condition exists in the nose or throat to prolong the carrier phase.

The variations in type occur probably through the introduction of fresh infections from other areas, carrying with them characteristics which vary from time to time in much the same way as the common cold varies from year to year. As was quoted in the *Proceedings of the Royal Society of Medicine*,⁽⁴⁾ another factor may also be present:

It seems probable, although open to question, that the fluctuations of type observed in many areas over a period of years are due to the waxing and waning of virulence of a number of independent races, rather than to mutations from one to another.

Diphtheria Immunization and Other Infections.

Although it is difficult to understand any accepted association between diphtheria immuniza-

tion and protection from other infections, those in charge of the Largs Bay Orphanage and the Brompton public school have remarked this year on several occasions that they have noticed a decided absence of common colds amongst children who have received diphtheria anatoxin. In a subsequent paper I shall deal with this aspect in relation to anterior poliomyelitis. W. G. Heaslip⁽⁵⁾ has already dealt with certain more general and detailed aspects of this subject in a paper now being submitted for publication, and as far as South Australia is concerned, based in the first place, as regards diphtheria immunity, on findings made at Hindmarsh before he took over the work on his investigation.

Summary.

1. Schick testing one and two years after immunization with diphtheria anatoxin has revealed a probable conversion rate of 98.9%.
2. In a small series the spacing of doses of anatoxin at intervals of five weeks gave poorer results than the usual three weeks.
3. An anomalous reaction to the Schick test is described.
4. Evidence is given to show that persons artificially immunized do not act as carriers so often as unimmunized persons. When they do, it is for a short time.
5. During the two years that have elapsed since immunization was introduced to Hindmarsh, there has been no evidence of increased virulence of strains of *Corynebacterium diphtheriae* in the district.

Acknowledgement.

I am indebted to Dr. J. A. Bonnin, Dr. A. D. Byrne, Dr. C. F. Drew, Dr. C. F. Pitcher, Dr. J. G. Sweeney and Dr. R. D. Wallman, for assistance with the Schick test inoculations.

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A NOTE ON THE ADMINISTRATION OF VINYL ETHER.

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VINYL ether (divinyl ether, vinethene or vinethene, $\text{CH}_2=\text{CH}-\text{O}-\text{CH}=\text{CH}_2$) is the latest addition to the range of inhalational anaesthetics. Details of its chemical properties and pharmacological action may be found in the literature, of which a short bibliography is given at the foot of this article. The clinical advantages claimed for vinyl ether may be briefly summarized as follows:

1. It is an agreeable, rapidly acting, rapidly eliminated anaesthetic, the use of which is rarely followed by after-sickness. In these respects, it has been compared even with the gaseous anaesthetics.

2. Whilst lying possibly between ethyl ether and ethyl chloride in point of toxicity, it approaches more nearly to the former. It may therefore be given for long periods with relative safety, which is not the case with ethyl chloride.

3. Vinyl ether produces excellent muscular relaxation, comparable with that encountered under chloroform, but it has a wider margin of safety than chloroform and is not apt to excite primary cardiac syncope.

4. Although it may excite profuse salivation, vinyl ether is not an irritant to the lungs. It may therefore be employed, either alone or as a supplement to gaseous anaesthetics, in cases in which ethyl ether is contraindicated by the presence of tuberculosis or of active inflammatory disease of the lungs.

The present article is concerned, however, less with the clinical uses of vinyl ether than with the technique of its administration, the more so since attention must be paid to the question of apparatus if the administration is to be satisfactory and reasonably economical.

Methods of Administration.

The following methods of administration have been suggested in the literature: (i) by the open drop method, (ii) by the closed inhaler and (iii) by gas anaesthesia apparatus.

Vinyl ether is so volatile, and its cost in this country is so great, that the open drop method of administration is quite uneconomical.

The use of a Clover's or Goldman's inhaler was suggested in the earlier literature. The technique was intended for single-dose administrations. The contents of one ampoule or more of vinyl ether were placed in the inhaler; the bag was filled with oxygen and the apparatus was applied to the patient's face until consciousness was abolished. The inhaler was then removed, about one hundred seconds being left for the performance of the operation, unless reinduction was practised. Obviously, employed in this way, vinyl ether could have only limited scope.

For its administration vinyl ether may be placed in the ether chamber of any gas machine and vaporized, either by means of oxygen or of a nitrous oxide and

oxygen mixture. Rowbotham's bottle, originally designed for the addition of chloroform to nitrous oxide and oxygen mixtures, suggested itself as very appropriate for vinyl ether. The small size of the bottle matched the small volume of vinyl ether employed, and the fine control mechanism suited its potency as an anaesthetic. Vinyl ether has been given in this way, either alone or as an adjuvant to gaseous anaesthetics. For reasons of economy, it was found desirable to incorporate in the system a soda-lime filter, either one of the circle type or a Waters's canister.

In using vinyl ether as an anaesthetic *per se*, the present writer set aside any thought of administering it through a gas machine. There seemed to be no purpose in transporting a relatively cumbersome gas-anaesthesia apparatus for the sake of giving a drug which offered no great advantages over the anaesthetic gases. The writer, therefore, began by laying down certain definite requirements, as follows:

1. Vinyl ether was to be used for minor operations and for relatively short administrations, since its use in major surgery seemed to hold no advantages over gaseous anaesthetics or even ethyl ether.

2. Portability was therefore essential in any vinyl ether apparatus. If it was to become cumbersome, gas-anaesthesia apparatus (and gaseous anaesthetics) might well be substituted for it.

3. Provision was to be made for administrations lasting for twenty minutes at least, since the superiority of vinyl ether to the more portable ethyl chloride lies in the fact that prolonged administration is possible with safety. It was therefore necessary to provide for a sufficient and controllable supply of both vinyl ether and oxygen.

4. Soda-lime absorption was to be employed in the interests of reasonable economy.

Sight-Feed Vinyl Ether Apparatus.

The first apparatus constructed by the writer, in his attempt to achieve the above requirements, aimed

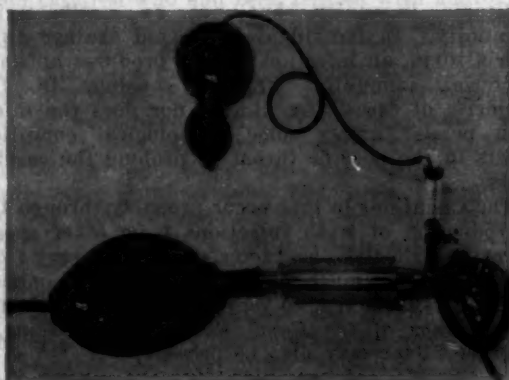


FIGURE I.
Sight-feed vinyl ether apparatus.

primarily at portability. It is illustrated in Figure I, and a diagrammatic structural drawing is given in Figure II, the essential dimensions being indicated.

The vinyl ether container consisted of a glass tube, cemented into a threaded metal ring at one end and into a nipple at the other. The tube was closed by a screw cap and contained approximately sixteen cubic centimetres of vinyl ether. By means of its nipple it was screwed into a brass block, which had been fashioned into a fine-adjustment screw valve, as shown in the diagram. Into the lower surface of this block was screwed a miniature sight-glass, consisting of a glass tube cemented into an appropriate metal housing. Having traversed the sight-glass at a rate controlled by the screw valve, the vinyl ether was free to enter a tubular fitting containing a hollow cylinder of brass gauze, upon the surface of which the drug volatilized. One end of the tubular fitting was connected, by means of a tapered slip-joint, with a McKesson mask of the 1929 pattern; the other end was similarly connected with a soda-lime canister. This last was smaller than the standard Waters's pattern and held 140 grammes (five ounces) of soda-lime. It differed also in having plain, instead of conical, end-plates. This defect, permitted for ease in construction, did not add unduly to the respiratory resistance offered by the canister, especially in a short administration. The smallest diameter of any part of the tubular fitting and canister was 2.2 centimetres. The aperture in the mask was smaller and therefore not ideal; but the resistance so produced was probably immaterial in the short administrations for which the apparatus was intended. To the canister was attached a one-gallon rubber bag; this in turn was connected to a 90-gallon cylinder of oxygen by means of a plain yoke adapted to take a rubber tube. The whole apparatus, when taken apart, was readily accommodated in an attaché case.

In use, the mask was applied to the patient's face and retained by means of a Clausen's harness. The bag was filled with oxygen. Vinyl ether was allowed to fall, drop by drop, through the sight feed into the apparatus until consciousness was lost. It was found that, in the handling of a drug so volatile, a vapour pressure was soon built up below the sight feed and the flow of vinyl ether was arrested. It was therefore found necessary to put positive pressure upon the vinyl ether in the container by means of a small hand bulb. Consciousness having been abolished, the flow of vinyl ether was suspended until the full effect of the previous dose became apparent; more was then given until the desired depth of anaesthesia was attained. The operation could now commence, the patient breathing to and fro through the soda-lime in a totally enclosed atmosphere of vinyl ether and oxygen. As the oxygen in the bag was gradually depleted by the patient, the partial pressure of vinyl ether became proportionately greater; hence, further additions of oxygen were necessary from time to time to prevent anaesthesia from becoming unduly deep. More vinyl ether was given at need to compensate for leakage or for possible over-oxygenation.

Although it was found practicable to give vinyl ether in this way for operations lasting for ten or fifteen minutes, yet the apparatus was far from ideal. The disadvantages were the following: (i) The weight of the apparatus tended to lift the mask away from the face, favouring leakage. (ii) The vinyl ether container was small and not easily refilled, yet could be enlarged only by aggravation of the first objection. (iii) The faulty balance of the apparatus made it difficult to avoid air leakage in the event of the patient's struggling. (iv) Any tilting of the apparatus to conform to the patient's

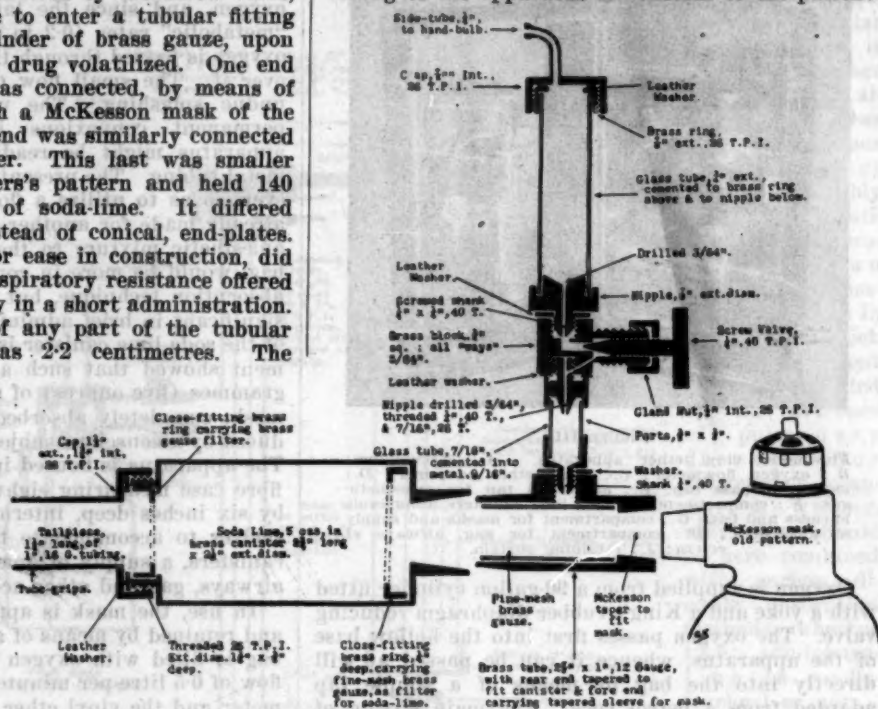


FIGURE II.
Sight-feed vinyl ether apparatus; structural diagram.

position was apt to impair the steady, drop-by-drop flow of vinyl ether through the sight glass and to replace it by an indefinite seepage down the walls of the latter. (v) The addition of oxygen from time to time, in arbitrary amounts, was unscientific and unfavourable to smooth anaesthesia.

These objections apply with less force when vinyl ether is used in a gas-anaesthesia apparatus. The tubular fitting which holds the metal-gauze vaporizer may be adapted to fit any gas machine. In this position it is stationary and vertical; the hand bulb may be retained and an even flow of anaesthetic through the sight feed assured. Vinyl ether may be thus added, drop by drop, to gas-oxygen mixtures. Carbon dioxide adsorption may be practised, the appropriate flow meter attached to the gas machine supplying the required minute volume of oxygen.

The writer resolved, however, to construct a further apparatus for the administration of vinyl ether *per se*, which would be almost as compact as

the night-feed apparatus described above, but which would avoid its drawbacks.

(2) Flow Meter Vinyl Ether Apparatus.

The apparatus finally evolved is illustrated in Figure III, and a diagrammatic structural drawing appears in Figure IV, the essential dimensions being indicated. It will be seen that the principle employed is that of the ordinary water flow meter familiar to gas anaesthetists.



FIGURE III.

Flowmeter vinyl ether apparatus. A.: screw-valve; B.: oxygen flowmeter; C.: vinyl ether container; D.: oxygen by-pass tap; E.: additional tap for anaesthetic gas; F.: compartment for soda-lime canisters, Clausen's harness and bag; G.: compartment for masks and supply of anaesthetic; H.: compartment for gas, airways et cetera; J.: retaining curtain.

Oxygen is supplied from a 90-gallon cylinder fitted with a yoke and a King's rubber diaphragm reducing valve. The oxygen passes first into the hollow base of the apparatus, whence it can be passed at will directly into the bag by means of a simple tap adapted from a petrol cock. The main stream of oxygen ascends the central tube of the hollow pillar of the apparatus, leaving it at the top and passing through a rubber tube to the screw valve. Traversing the valve, the oxygen enters the flow meter. This is a standard glass tube, obtained from Australian Oxygen and Industrial Gases, Proprietary, Limited, and housed in a glass case. The metallic mount for the flow meter tube requires to be drilled with a standard drill and the blank scale subsequently calibrated against a standard litre flow meter; the writer is indebted to the commercial firm mentioned above for performing this drilling and calibration. The flow meter is designed to deliver one litre of oxygen per minute and is calibrated into tenths of a litre.

Leaving the flow meter, the oxygen passes through a rubber tube to the vinyl ether bottle. This is a one-ounce ointment pot, secured in a suitably threaded mount; the coarse "jam-jar" thread is unscrewed in a half-turn of the pot, refilling during an administration thus being facilitated. A miniature control tap directs the flow of oxygen at will, either (a) through the vinyl ether, (b) into the hollow pillar of the apparatus, without access to the vinyl ether or (c) fractionally along both paths. In this way, any

desired mixture of vinyl ether and of oxygen may be obtained. This mixture, having traversed the hollow pillar, is led off at the bottom to a Y-piece, where it joins any oxygen which may have been drawn off by means of the direct-flow tap without having passed through the flow meter. The third arm of the Y-piece is connected by a rubber tube with the bag; the latter in turn is attached to a canister of the type described above and holding 140 grammes (five ounces) of soda-lime. It differs from the above-mentioned canister in the fact that it connects directly with the McKesson mask without the intervention of a tubular vaporiser. As in the previous case, however, the connexion is made by means of a tapered slip-joint.

Since the vinyl ether is vaporized by means of oxygen, and since the latter is delivered only at "metabolic" rates (0.2 to 0.4 litre per minute), the oxygen is passed through the vinyl ether rather than over it. The small flow of oxygen does not cause undue splashing. The use of rubber tubing in permanent connexions is not ideal, and the apparatus might be readily constructed with all-metal tubing. The present design was adopted, however, so as to utilize a flow meter which had been already made for another purpose. Delivery of the anaesthetic mixture to the mask, instead of to the bag, would be more in conformity with the Waters absorption technique, but the point has not proved significant in brief administrations. The small size of the soda-lime canister is not a drawback. Experiment showed that such a canister, containing 140 grammes (five ounces) of soda-lime of Wilson's 8-14 mesh, completely absorbed the carbon dioxide produced by a conscious subject for a period of an hour. The apparatus is housed in one half of a two-leaved fibre case measuring eight inches by sixteen inches by six inches deep, internally. The other half has shelves to accommodate two masks, two soda-lime canisters, a supply of anaesthetic and the necessary airways, gag and other accessories.

In use, the mask is applied to the patient's face and retained by means of a Clausen's harness. The bag is filled with oxygen from the by-pass tap. A flow of 0.5 litre per minute is obtained from the flow meter and the vinyl ether tap is turned to the "full on" position. After a few breaths it is turned to "off" for a few moments; the flow of vinyl ether is then commenced once more. In this way, consciousness may be abolished without unpleasant sensations due to the rapid gaining of a high concentration of so volatile and pungent a drug. Further, time is given for the effect of each addition of vinyl ether to become manifest. When the desired depth of anaesthesia has been reached, the flow of vinyl ether is checked and the minute volume of oxygen is reduced to 0.3 litre. Additions to or subtractions from this flow are made subsequently in accordance with the clinical signs in the same way as when gaseous anaesthetics are being given by the method of carbon dioxide absorption. More vinyl ether may be supplied as needed to compensate for leakage or over-oxygenation. Whilst a minute-flow of 0.5 litre will ordinarily serve to carry in a sufficient amount of vinyl ether, yet a more rapid concentration may be gained at need if the minute volume of oxygen passed through the anaesthetic is increased, for example, to 0.8 litre. Serious over-dosage may be combated by recourse to the direct-flow oxygen tap.

Some Applications of Vinyl Ether.

By courtesy of the Australian representative of the firm of May and Baker, a supply of vinyl ether was made available to the writer for testing at the Alfred Hospital, Melbourne. It sufficed for the experimental work on apparatus which is embodied in this paper and for between twenty and thirty clinical administrations. These were for minor operations not exceeding twenty minutes in duration, such as the incision of abscesses, reduction of fractures and performance of orthopaedic manipulations. The writer is not entitled to definite opinions on the strength of experience so limited, particularly as it was not possible to arrange for adequate physiological observations to be made upon the patients during anaesthesia. What follows, then, must be regarded merely as a preliminary report based upon clinical impressions.

The writer is disposed to accept the claims made for vinyl ether which are set out at the beginning of this paper. He feels, however, that the potency of the drug, the indefinite character of the signs of anaesthesia and the specialized apparatus necessary for efficient and economical administration, render vinyl ether of questionable value to the occasional anaesthetist. He regards it as unlikely to replace gaseous anaesthetics, or even ethyl ether, in routine anaesthesia for major surgical operations.

In minor surgery, it appears to have definite advantages over ethyl chloride, being probably less toxic and being capable of prolonged administration. The advantages are, however, less significant in institutional practice, in which gaseous anaesthetics are readily available and problems of transportation do not arise. Further, vinyl ether is a costly anaes-

thetic in this country, the initial price being high and the deterioration or evaporation of the drug rapid if it is not used soon after being opened. It is possible that the scope of vinyl ether may prove to be limited to its use in the following circumstances:

(a) As an alternative to ethyl chloride in minor operations on good risk patients, in circumstances in which gas anaesthesia is not readily available;

(b) as an agreeable, quickly eliminated anaesthetic for minor procedures such as orthopaedic manipulations, in which temporarily profound muscular relaxation is sought together with recovery almost as rapid as that following gas anaesthesia;

(c) as a probably desirable substitute for chloroform as an adjuvant to gaseous anaesthetics in cases in which ether supplement is contraindicated by the presence of pulmonary disease. For reasons of economy, however, vinyl ether should be here combined with carbon dioxide absorption methods; whether the administration is endotracheal or not.

Adaptation of Vinyl Ether Apparatus to Gas Anaesthesia.

The vinyl ether apparatus described above may be readily adapted to gas anaesthesia. The addition of a second flowmeter

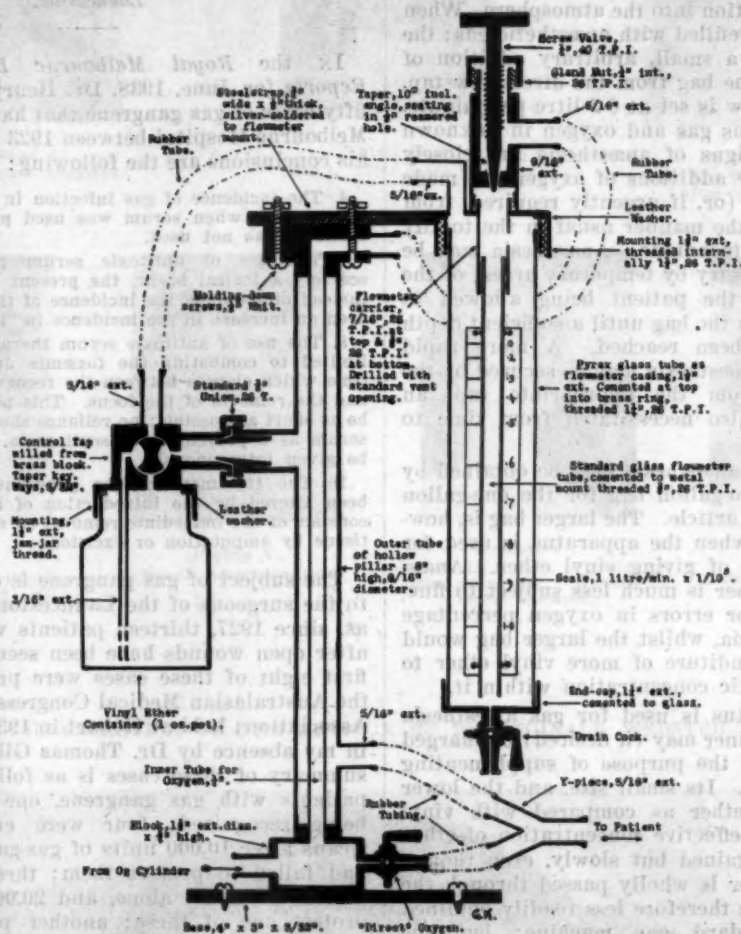


FIGURE IV.
Flowmeter vinyl ether apparatus; structural diagram.

for anaesthetic gas would transform it into a fully equipped, miniature gas machine. Actually, if the carbon dioxide absorption technique is retained, measurement of the anaesthetic gas is not obligatory. It merely suffices to provide some means of filling the bag with gas, the subsequent depth of anaesthesia being controlled by the basal oxygen flow. A fitting for anaesthetic gas may be therefore mounted in the case, as shown in Figure III. It consists merely of a petrol cock and a delivery tube. The latter is connected, by means of a rubber tube, to a small cylinder of gas fitted with

a King's reducing valve. The petrol cock is similarly connected to a four-way tubular connexion which replaces the Y-piece illustrated in Figure IV; the extra arm in the connexion enables anaesthetic gas to be delivered to the bag by the mere opening of the petrol cock.

In use, it is first necessary to flush out the air contained in the apparatus and the patient's lungs. He is accordingly allowed to breathe a bagful of oxygen, the exhalation valve being left open to permit of free expiration into the atmosphere. When depleted, the bag is refilled with anaesthetic gas; the valve is closed and a small, arbitrary addition of oxygen is made to the bag from the direct-flow tap. The basal oxygen flow is set at 0.2 litre per minute. The bag now contains gas and oxygen in unknown proportions. The signs of anaesthesia are closely observed and further additions of oxygen are made from the flow meter (or, if urgently required, from the by-pass tap) in the manner usual in the totally enclosed absorption technique. Anaesthesia may be deepened when necessary by temporary arrest of the basal oxygen flow, the patient being allowed to deplete the oxygen in the bag until a sufficient depth of anaesthesia has been reached. A more rapid change in plane of anaesthesia may be secured by the addition of gas from the appropriate tap, an addition which is also necessitated from time to time by leakage.

Rather more even anaesthesia may be obtained by substitution of a two-gallon bag for the one-gallon bag described in this article. The larger bag is, however, uneconomical when the apparatus is used for its primary purpose of giving vinyl ether. Anaesthesia with vinyl ether is much less subject to fluctuation due to minor errors in oxygen percentage than is gas anaesthesia, whilst the larger bag would necessitate the expenditure of more vinyl ether to produce an anaesthetic concentration within it.

When the apparatus is used for gas anaesthesia the vinyl ether container may (if desired) be charged with ethyl ether for the purpose of supplementing the effect of the gas. Its small size, and the lower volatility of ethyl ether as compared with vinyl ether, mean that an effective concentration of ether in the bag will be gained but slowly, even though the basal oxygen flow is wholly passed through the ether. Relaxation is therefore less readily obtained than with a standard gas machine; but the apparatus will serve well for minor administrations. Indeed, with experience in the carbon dioxide absorption technique, it may be made to serve for other than minor surgery.

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GAS GANGRENE.

By C. CRAIG, M.D., M.S. (Melbourne), F.R.A.C.S.,
 Launceston.

IN the *Royal Melbourne Hospital Clinical Reports* for June, 1938, Dr. Henry Searby analyses fifty cases of gas gangrene that have occurred at the Melbourne Hospital between 1923 and 1936. Among his conclusions are the following:

4. The incidence of gas infection in compound fractures was greater when serum was used prophylactically than when it was not used.

7. The use of antitoxic serum prophylactically has scarcely a logical basis; the present analysis shows that instead of reducing the incidence of the disease, there has been an increase in the incidence in "immunized" patients.

8. The use of antitoxic serum therapeutically should be limited to combating the toxæmia during the period of time which elapses between the recognition of the disease and the removal of the focus. This period of time should be as short as possible; no reliance should be placed on the serum as a preventive of septicæmia. The serum should be given intravenously.

10. The treatment of gas gangrene infection has not been altered by the introduction of antitoxic serum. It consists of the immediate removal *en masse* of the infected tissue by amputation or excision.

The subject of gas gangrene is of special interest to the surgeons of the Launceston Public Hospital, as, since 1927, thirteen patients with gas gangrene after open wounds have been seen. Reports of the first eight of these cases were presented by me to the Australasian Medical Congress (British Medical Association) held at Hobart in 1934, in a paper read in my absence by Dr. Thomas Giblin. The general summary of these cases is as follows: of the eight patients with gas gangrene, one died without its being recognized; four were cured by surgical means after 10,000 units of gas-gangrene antiserum had failed to protect them; three were cured by serum treatment alone, and 20,000 units failed to protect one of these; another patient died from pelvic sepsis three months after operation.

Since then five cases have occurred. Three patients were cured by serum alone, one was cured by amputation and serum, and one, admitted to hospital from the country in a moribund condition, died. Of these patients, four developed the gas gangrene after receiving prophylactic doses of from 10,000 to 20,000 units.

It will therefore be seen that although we agree with Dr. Searby that small doses of serum given intramuscularly are of no value in prophylaxis, we differ widely from him on the subject of treatment. This matter is of such great importance that I propose to review the histories of the patients already reported as cured, to present reports of the

ILLUSTRATIONS TO THE ARTICLE BY DR. ALAN H. PENINGTON.



FIGURE I.
Case I. Before operation.



FIGURE II.
Case I. After operation.



FIGURE III.
Case I. Twelve months
after operation.

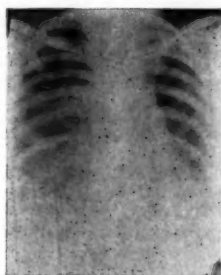


FIGURE IV.
Case II. Right artificial
pneumothorax and left
apical cavity.



FIGURE V.
Case II. After operation.



FIGURE VI.
Case III. Left artificial
pneumothorax without
apical collapse.



FIGURE VII.
Case III. Six months
after the operation.

ILLUSTRATION TO THE ARTICLE BY DR. REGINALD WEBSTER.

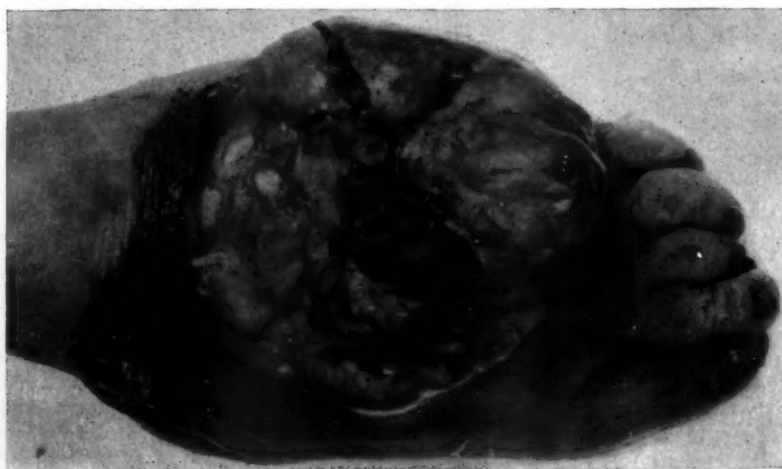


FIGURE XXII.
Osteogenic sarcoma.

ILLUSTRATIONS TO THE ARTICLE BY ELIZABETH K. TURNER AND DR. RUPERT A. WILLIS.

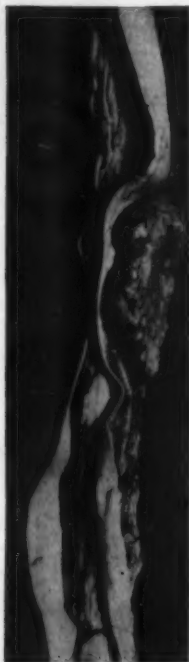


FIGURE I.
View of the spinal
cord, dura and
extradural tumour.



FIGURE II.
View of the spinal
cord, dura
and extradural
tumour.

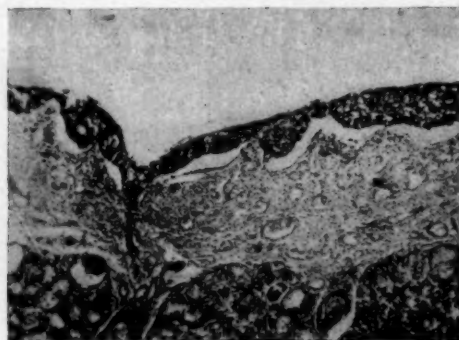


FIGURE III.
Photomicrograph of part of the primary bronchial
growth, showing even replacement of the normal
epithelium by a layer of carcinoma. ($\times 45$.)



FIGURE IV.
Another part of the bronchial growth, showing small
nodular masses of carcinoma on the surface and
permeation of the subjacent lymphatics. ($\times 45$.)

ILLUSTRATIONS TO THE ARTICLE BY DR. C. A. DUNCAN.

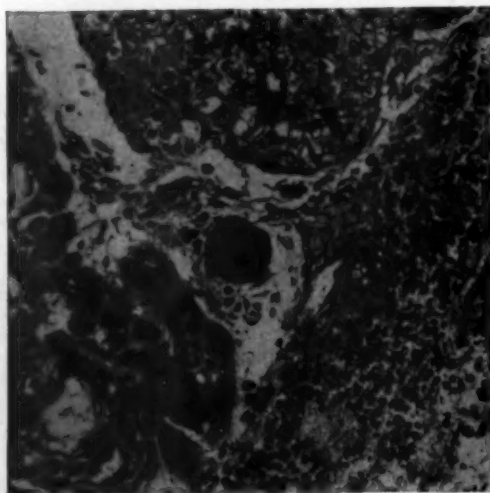


FIGURE I.
Photomicrograph of a section from a brain metastasis,
showing the tumour structure. Note the mitoses,
marked *M*, and the phagocytic reaction. ($\times 200$.)



FIGURE II.
Photomicrograph, showing hyperplasia of breast
tissue. ($\times 50$.)

additional cured patients, and to attempt an explanation of the discrepancy between Dr. Searby's results and our own.

Patients Already Reported as Cured.

CASE VI.—The patient was a young man under the care of Dr. G. E. Clemons. His left leg had been crushed by a tree six hours before admission to hospital. There was a bad crushing injury of the left leg, both bones being broken. The usual technique of repair was carried out and 1,500 units of tetanus antiserum were given, as is the routine for all open wounds. The resident medical officer at this time was Dr. Frank Drew, who had been very interested in the occurrence of gas gangrene. At his suggestion the prophylactic dose of gas-gangrene antiserum was doubled, 20,000 units being given.

Everything went well till the third day. It is noteworthy that in none of the other cases was the incubation period longer than two days. On the third day the patient's temperature rose and there was a suggestive odour about the wound. A skiagram was taken and showed bubbles of gas. Now, at this stage, a doubt arose. After the operation Dr. Clemons had laid in some tubes for continuous irrigation. One of these tubes was inserted deeply into the wound. It was found that the solution was not running into this particular tube in the ordinary way, so orders were given to syringe the solution in. Thus a doubt arose as to whether the bubbles of gas were not actually air. At all events the patient's condition was very good, and it was decided to use conservative measures. A culture was taken. Twenty thousand units of gas-gangrene antiserum were given intravenously and thirty thousand intramuscularly. Twenty-four hours later examination of the culture revealed the organisms of gas gangrene. By this time, however, the patient's condition had so improved that it was decided to continue the conservative treatment. The same dose as before was given on each of the next two days. For the following three days eighteen thousand units per day were given intramuscularly. The total amount given was 204,000 units. On the eighth day after operation an extraordinary thing happened. The patient showed symptoms of lockjaw in spite of a prophylactic dose of 1,500 units of tetanus antiserum. He complained of stiffness of the right shoulder; this was followed by stiffness of the jaw and inability to open the mouth. Massive doses of tetanus antiserum were given and he recovered. This patient has thus had the curious distinction of suffering from two serious anaerobic infections from the same wound.

Although doubt has been recorded as to the diagnosis in this case, those who smelt the wound and saw the X ray photograph have very little doubt. It might seem that the positive culture would clinch the diagnosis. This is not so, however. As Dr. Searby has pointed out, the fact that the organisms can be recovered from the wound does not necessarily mean that they are pathogenic. It could, therefore, be technically stated that this was not a case of gas gangrene.

CASE VII.—The patient was a middle-aged man under my care. Five days before admission to hospital he had sustained a compound fracture of the left tibia and fibula in a falling accident. He had been in a country hospital for some days. The leg below the knee was dead, probably as a direct result of the accident. The wound was infected with gas gangrene, and there was a broad belt of gas gangrene ascending the front of the thigh and reaching as high as the umbilicus. Amputation was carried out through the middle of the thigh. It was an extraordinary experience to be actually cutting through gas gangrene in a living man. He was given 40,000 units of antiserum before operation and 40,000 afterwards. In the next two days 120,000 units were given; 200,000 units were given in all. The area of gas gangrene gradually faded in a most dramatic fashion in these two days. This patient

ultimately got a pelvic infection, probably ascending from the amputation stump. Eventually he died, three months after the operation, death being obviously not due to gas gangrene.

There was no doubt that this was a case of gas gangrene; but in describing it I should have pointed out that the gas was found to be in the subcutaneous tissues only and was not in the muscles. As gas gangrene is not so virulent in the subcutaneous tissues as it is in the muscles, all that can be stated in this case is that the serum caused the disease to recede from the subcutaneous tissues.

CASE VIII.—The patient was a young man under the care of Dr. Alan Pryde. Twenty-four hours before admission to hospital he had been involved in a railway accident. There was an extensive laceration of the left leg below the knee, practically all the extensor muscles having been torn away. There was an odour about the leg which suggested gas gangrene, although none could be demonstrated. However, 60,000 units of antiserum were given at once. On the next day there was an offensive discharge from the wound. A culture was taken. X ray examination revealed gas in the muscle planes. A further dose of 40,000 units of antiserum was given. On the next day the gangrene was spreading up the subcutaneous tissue on the inner side of the leg. Over the next five days 70,000 units more were given; by this time the gas gangrene had disappeared. The total dose was 170,000 units. The culture revealed an anaerobic gas-forming bacillus.

Gas gangrene was, in this case, undoubtedly present in both the subcutaneous and muscular tissues.

Additional Cases Since 1933.

CASE IX.—The patient was a man under the care of Dr. Pryde. He was admitted to hospital on November 8, 1934, and discharged on March 17, 1935. He had sustained a compound fracture of the tibia and fibula. The standard operation was performed and the wound sutured. Tetanus antiserum (3,000 units) and gas-gangrene antiserum (20,000 units) were given.

Forty-eight hours after his admission to hospital gas gangrene was obvious in the wound. The wound was reopened and Carrel-Dakin irrigation was commenced. Gas-gangrene antiserum (100,000 units) was given. Next day another 100,000 units were given. The gas gangrene gradually subsided.

CASE X.—The patient was a man under the care of Dr. Clemons, senior. He was admitted to hospital on September 12, 1934, and discharged on October 4, 1934. He had sustained a compound comminuted fracture of the left humerus. A standard operation was performed. The brachial artery and the median nerve were found severed. The wound was closed and a plaster mould was applied. Injections of 1,500 units of tetanus antiserum and of 10,000 units of gas-gangrene antiserum were given. Thirty-three hours after the patient's admission to hospital the wound was found to be infected by gas gangrene. At 11 a.m. 60,000 units of gas-gangrene antiserum were given. At 4.30 p.m. the gas gangrene was found to be obviously advancing. An X ray photograph revealed the presence of gas high up in the axilla. Amputation was performed five centimetres (two inches) below the head of the humerus. The incision was made through crepitant tissue, and some crepitant tissue which had been left behind was cut out. Gas-gangrene antiserum (45,000 units) was given; 15,000 units were given intravenously. During the next three days 164,000 units were given. The patient recovered.

CASE XI.—The patient was a young man under the care of Dr. Clemons, senior. He was admitted to hospital on April 21, 1936, and discharged on January 13, 1937. He had sustained a compound fracture of the right tibia and fibula and fracture of the left femur, as well as con-

cussion. He was given 1,500 units of tetanus antiserum and 10,000 units of gas-gangrene antiserum. The patient was so ill that no attempt was made to deal with the wound until fourteen hours after his admission to hospital. The wound was then only washed out. Within twenty-four hours of his admission to hospital signs of gas gangrene were obvious. He was given 70,000 units of gas-gangrene antiserum. Twenty-four hours later he was very ill, and 100,000 units were given. In the next two days 80,000 more units were given, and the gas gangrene gradually subsided.

CASE XII.—The patient was a man under the care of Dr. Hogg. He was admitted to hospital on December 12, 1936, and discharged on December 5, 1937. He had sustained a fracture of the left femur and a compound crushing fracture of the right foot. He was given 1,500 units of tetanus antiserum and 10,000 units of gas-gangrene antiserum soon after admission to hospital, and another 10,000 units of gas-gangrene antiserum at operation two hours later. Sixty hours after his admission gas gangrene was obvious in the foot wound. He was given 70,000 units of gas-gangrene antiserum intramuscularly. There is no record of any further dose. The gas gangrene gradually subsided.

CASE XIII.—The patient was a man under the care of Dr. Pryde. He was admitted to hospital on February 16, 1937, from the country, where he had injured his leg four days previously. He was moribund, and the leg was a mass of gas gangrene. He was given 80,000 units of gas-gangrene antiserum as an initial dose, and received a total of 100,000 units. Death occurred on February 18, 1937.

Summary.

In a review of the whole thirteen cases, it is found that one patient died without his disease being recognized; four were cured by surgical means without serum being tried as treatment. Of the remaining eight, one was admitted in a moribund condition and was treated by serum, but could scarcely have been expected to live. The remaining seven patients were all good candidates for serum treatment. Of these six were cured by serum alone, and one was cured by amputation with serum.

Nine of the patients had had from 10,000 to 20,000 units of antiserum as a prophylactic dose.

General Considerations.

Laboratory Aid in the Diagnosis of Gas Gangrene.

In the discussion of my paper in Hobart, Dr. A. E. Coates is reported to have said that he thought it was rather unfortunate that there was not a more complete bacteriological record. He also said that the *Bacillus welchii* had possibly not been present in all the cases, and that air sometimes got under the flaps after operations on compound fractures leading to crepitus in the calf muscles. He had seen this occur several times in patients whose condition was good. He had done nothing and the patients had progressed quite favourably. Dr. Coates then said that this condition was especially apt to occur if irrigation was carried out, as was done in my cases.

The first part of this criticism must be accepted. When gas gangrene is known to exist clinically, it is very desirable that the organisms present should be classified. It was unfortunate that we had no bacteriological facilities at that time. Since then,

the Commonwealth Laboratory has been established and we have been able to have bacteriological tests made. Dr. Searby has made it clear, however, that for the diagnosis of gas gangrene to be complete the clinical manifestations must be definite. The bacilli can apparently be present in the culture and yet not be active. Fortunately the clinical manifestations of gas gangrene are unique. The patient quickly becomes very ill, the temperature is high, the pulse is rapid and bounding; locally, the smell is characteristic, the appearance is characteristic, the feel is characteristic, and the X ray photograph is characteristic. This clinical picture can be imitated by no other acute infection, and certainly not by air under the flaps. This picture was present in every case that has been reported; and doubt arose and was recorded in Case XI, the one case in which irrigation was used.

The Prophylactic Use of Serum.

In spite of the fact that it was known that 10,000 units or 20,000 units would not protect patients against gas gangrene, our surgeons have persisted with these injections. Their reason for doing this was that, although it would not protect against gas gangrene, the presence of the serum might retard its early progress if it did occur. There is much to be said for this idea; but if it is to be carried to its logical extreme a much larger dose should be given—say 40,000 units. This is very expensive. In view of the fact, brought out by Dr. Searby, that the rate of elimination of serum in animals is much faster and the maximum concentration reached is much lower if there has been a previous injection of serum, it is doubtful if this practice should continue. One wonders if this applies when the first injection of serum has been made within the previous forty-eight hours.

The Use of X Ray Examination in Early Diagnosis.

In any fulminating disease such as gas gangrene it is very desirable that the diagnosis should be made at the earliest possible moment so that effective treatment can be started. If the serum treatment of gas gangrene is to bring about a cure, this is of vital importance. It so happens, however, that there is often an interval between the rise of temperature and pulse rate and the manifestation of the ordinary clinical signs. In his paper, Dr. Searby says: "In many instances the symptoms had existed for from six to twelve hours before the signs appeared." This is a very big start to give a disease which can kill a patient, as it did in Case I of our series, within twenty-four hours of the appearance of the first symptom. It is in these cases that the X ray examination is of such great value. We have found that the X ray photograph will show the gas in the tissue soon after the rise in temperature and in the pulse rate (see Cases I, III, V, VI, VIII). The following routine has been suggested. After operation the patient's temperature is taken every hour; the wound is smelt, and, if possible,

inspected on each of these occasions. On the slightest suspicion the whole dressing is removed and the wound is closely examined. If suspicion still exists an X ray photograph is taken. If necessary, the X ray examination is repeated hourly. If the presence of gas is revealed, a specimen is taken for culture, but the treatment is commenced at once.

It is obvious that difficulty is likely to arise if Carrel-Dakin irrigation is used. After consultation with Dr. W. P. Holman, our radiologist, I suggest the following routine in these cases. If, after the temperature and pulse rate have risen, the X ray film reveals the presence of gas, the irrigation is stopped. Films are then taken at hourly intervals. If the gas shadows increase the case is to be regarded as one of gas gangrene.

Dr. Searby does not mention the use of X ray examination in diagnosis.

Strains of Bacteria and Response to Serum.

One explanation of the discrepancy between our results and those reported by Dr. Searby is that the strains of bacteria are different in different situations, and that it happens by chance that in Launceston they are more responsive to treatment by serum. The strain is not a mild one here. All the patients who have suffered from it have been seriously ill.

Dosage of Serum and Methods of Administration.

In analysing the doses given therapeutically in his series, Dr. Searby divides them into three groups: (i) under 40,000 units (10 cases), (ii) between 40,000 and 80,000 units (7 cases), (iii) over 80,000 units (7 cases). The results were much better with the larger doses. Dr. Searby does not say whether these figures represent an initial (and final) dose or the total of divided doses.

In our successful cases the initial dose varied from 50,000 to 100,000 units and the total dosage from 170,000 to 250,000 units. Where there is a note as to how much was given intravenously and how much intramuscularly, this has been recorded. After what Dr. Searby has said about the relative value of the intravenous and intramuscular routes, it would seem that at each administration about one-third should be given intravenously.

Conclusions.

In view of the fact that several patients suffering from gas gangrene have been successfully treated at Launceston without secondary operation, the question as to the therapeutic value of gas-gangrene antiserum must be regarded as still an open one.

In order that the utmost value may be got from the serum, a routine for the post-operative observation of patients is suggested. This includes X ray examination. Dosage should be adequate. The serum should be given by both the intravenous and the intramuscular routes.

THE USE OF DERIVATIVES OF ACETYL CHOLINE AND ESERINE IN RETENTION OF URINE.

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DURING recent years the action of the parasympathetic nerves has aroused much interest in both medical and surgical practice. These parasympathetic fibres are included in the group descriptively called "cholinergic" by Dale, because they stimulate the peripheral cell by liberating acetyl choline at their endings. This acetyl choline is rapidly destroyed by an enzyme called cholinesterase, which is inhibited by the eserine derivatives. The action of the acetyl choline is prevented by atropine, which therefore inhibits parasympathetic stimulation.

Preparations of derivatives of acetyl choline and eserine are now on the market. Intramuscular injections of these derivatives result in a much more lasting parasympathetic action than injections of the original substances.

The acetyl choline derivative used in this series of cases was "Doryl" (Merck), which is carbaminoylcholine. It was kindly supplied by Messieurs Marcard and Company. The eserine derivative used was "Esmodil", which was kindly supplied by Messieurs Bayer Pharma Proprietary, Limited.

The parasympathetic action studied in this series was the contraction of the bladder detrusor and relaxation of the internal sphincter in cases of post-operative retention of urine and retention of urine in medical cases.

Unfortunately the vagal action in paroxysmal tachycardia was studied in only one case.

Retention of Urine.

It was decided to administer the drugs to 100 patients who had been unable to void urine. Of these, a group of 84 patients complained of discomfort. The remaining 16 patients were not distressed. The bladder pressure was estimated in some of these cases and was found to be invariable over 20 centimetres of water in the first group, but there was no measurable pressure in the second group. The inference is that retention in the first group was due to spasm of the internal sphincter, and in the second group to flaccidity of the bladder.

Each patient was given an intramuscular injection of either one ampoule of "Doryl", one ampoule of "Esmodil" or one cubic centimetre of sterile water. The order in which these injections were given was decided by means of a pack of cards, to preclude any conscious selection of cases. Random choice in such a series is essential to ensure the validity of any statistical results.

The following results were obtained and can be conveniently compared by means of a contingency table (Table I).

TABLE I.
Results of Injection of "Doryl", "Esmodil" or Sterile Water.

Substance Injected.	Results.		
	Number of Successful Cases.	Number of Failures.	Total Cases.
"Esmodil"	35	8	43
"Doryl"	25	5	30
Sterile water	3	24	27
	63	37	100

In the investigation of any measure in which results are not absolutely uniform, there can never be absolute certainty, and the probability (p) gives an indication of the degree of uncertainty in the experiment.

In a comparison of the action of both drugs with that of sterile water, the index of dispersion was found to be 12.07. This indicates that there is an enormous difference in response between the patients receiving the drugs and those receiving distilled water. The probability of these drugs being without effect is very small, p being less than 0.01.

In a comparison of the action of "Esmodil" with that of "Doryl" the index of dispersion was found to be 0.036. This indicates that there is no significant difference in the efficiency of the two drugs.

The types of cases in which the drugs were used, and their results, are shown in Table II.

TABLE II.
Cases in which "Doryl" and "Esmodil" were Used.

Pathological Condition or Surgical Procedure which Retention of Urine Followed.	Number of Successful Cases.	Number of Failures.
Appendicectomy	13	4
Inguinal hernia repair	10	4
Abdominal operations	8	0
Anal surgery	6	1
Head injuries	3	1
Spinal cord trauma	4	3
Fractured femur	2	0
Cardiac failure	3	0
Disseminated sclerosis	3	0
Progressive muscular atrophy	2	0
Spinal compression	1	0
Uremia	2	0
Administration of "Somnifaine"	3	0

In the case of progressive muscular atrophy, after two injections the bladder regained its normal function.

In the case of disseminated sclerosis the bladder never regained its function, but the injections were stopped because of unpleasant general reactions.

One case of paroxysmal tachycardia was observed.

The patient had been an in-patient three months previously with acute cardiac failure as a result of paroxysmal tachycardia. He was treated for three days by intermittent pressure on the carotid sinus and the administration of digitalis by mouth before his heart rate returned to normal. On this occasion he presented himself with acute cardiac failure and tachycardia, his heart rate being 220 beats per minute. After pressure on the carotid sinus had failed an injection of "Doryl" was given. At the end of thirty minutes the injection was repeated. Three minutes after the second injection his

heart rate returned to 80 beats per minute and his symptoms of cardiac failure disappeared. Subsequently he had an intense desire to micturate.

General Reactions.

Only one severe general reaction was observed.

Five minutes after an injection of "Doryl" a woman under treatment with "Somnifaine" began to sweat profusely. Tears streamed from her eyes, her breathing became stertorous, much froth appeared from her mouth, she became cyanosed and her pulse rate dropped to 60 beats per minute. While her medical attendant was preparing to administer an injection of atropine, her symptoms rapidly disappeared.

Mild general reactions, such as sweating, lachrymation and flushing, were common.

Summary.

1. The physiological action of "Doryl" and "Esmodil" is discussed.
2. The results of the use of the drugs in 100 cases are presented.
3. Statistical analyses of these results show that there is a reasonable certainty of the drugs' being effective.
4. General reactions are discussed.

Acknowledgements.

I wish to thank Sir Alan Newton for instituting the investigation, and those members of the staff who have permitted the administration of the drugs.

The statistical work was done by Dr. Michael Woodruff.

Reports of Cases.

PATHOLOGICAL REPORTS FROM THE CHILDREN'S HOSPITAL, MELBOURNE.

By REGINALD WEBSTER, M.D., D.Sc.,

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XIV. OSTEOGENIC SARCOMA.

THE museum specimen illustrated by Figure XXII, around which the ensuing discussion centres, had its source in an amputation of the left lower limb performed by Dr. H. Douglas Stephens in an attempt to stem the rapid advance of malignant disease in a boy, aged ten years.

Clinical History.

The clinical history, in a manner characteristic of Ewing's sarcoma and by no means uncommon in osteogenic sarcoma, led to a diagnosis of subacute osteomyelitis, and that aetiological contentious factor, trauma, appeared to initiate the train of events.

Three months prior to his first appearance at the Children's Hospital on September 18, 1934, the patient incurred an injury to his left foot by a heavy piece of wood, which fell across the dorsum of the foot. The immediate result was a bruise over the transverse articulation of the foot, and disability persisting, a skiagram was taken at another hospital approximately four weeks after the accident. This skiagram was interpreted as showing a small fracture of the third cuneiform bone, and when

the boy presented himself at the Children's Hospital his foot had been in plaster for six weeks.

Notes taken on removal of the plaster record general swelling, of slight degree, affecting the whole of the foot and unattended by any superficial oedema. Pressure applied to the dorsum of the foot elicited tenderness, most pronounced at the site of the third cuneiform bone and over the head of the fifth metatarsal bone.

A radiological report obtained on September 21, 1934, stated that the third cuneiform bone was of abnormal outline, density and fragmentation; it showed, in addition, a fracture line running through it.

Regarding the condition as one of subacute osteitis, Dr. Stephens made an exploratory incision on September 23, 1934. He found some erosion of the third cuneiform bone, and a light curettage brought away "gelatinous tissue". The adjacent bones appeared to be somewhat softened. Appropriate dressings and a light plaster bandage were applied to the foot and the boy, provided with crutches, was discharged to the out-patient department.

One month later swelling of the toes indicated removal of the plaster bandage. Swelling, redness and oedema affected the tissues of the dorsum of the foot about the site of the operative incision, which was gaping, and from which dark granulations protruded. A skiagram taken on October 26 "appeared to indicate extension of cavitation". On November 2, tissue which was still regarded as granulomatous was curetted away and submitted to me for histological examination. I reported the presence of a highly malignant "round-celled" sarcoma, upon which the boy was transferred to the Royal Melbourne Hospital in order that he might have deep X ray therapy.

On December 10 he returned to the Children's Hospital. His foot was now greatly enlarged, and an enormous fungous growth, hemorrhagic, friable and altogether horrifying, surmounted the dorsum of the foot, in the manner shown in the illustration (Figure XXII). The most case-hardened and insensitive clinical observer could scarcely suppress a shudder at first sight of such an appalling condition. Obviously the neoplasm had been quite refractory to irradiation therapy, and in its relentless advance it was now pervading the muscles of the calf of the leg, which were uniformly indurated.

Three days after the boy's return to the Children's Hospital his leg was amputated. The limb provided two museum specimens, one that photographed and reproduced as Figure XXII, and the other a transverse section of the calf of the leg, which confirmed the malignant infiltration of the calf muscles suspected clinically.

A fortnight after his leg was amputated the boy developed a troublesome cough. The presumption of pulmonary metastases was confirmed by radiological examination, and with the end imminent the lad's parents took him home on January 6, 1935. There are therefore no autopsy findings to record. As nearly as can be calculated the total duration of this tragic history was between six and seven months.

Histological Considerations.

The determination of the precise nature of this highly malignant tumour presented me with a very perplexing problem. In the report which I returned on the biopsy specimen I described it as a "round-celled" sarcoma, the component cells of which, as far as could be determined from the examination of a single microscopic section, showed no degree of differentiation, no cartilaginous, osteoid or bony tissue. Nothing could have been more suggestive of a sarcoma of the type known universally as Ewing's sarcoma than the clinical features exhibited by this boy. The antecedent trauma, ensuing pain and fever, clinical diagnosis of osteomyelitis, the rapid and exuberant growth of "granulations" following the exploratory incision, comprise a sequence of events which is characteristic of Ewing's sarcoma. Another factor leading to the same conclusion of probability was the origin of the tumour in one of the small bones of the foot, as opposed to the metaphysis of one of the long bones of the skeleton—the site of election of osteogenic sarcoma.

A serious clinical objection to the maintenance of a diagnosis of Ewing's sarcoma was the fact that the progress of the neoplasm was not retarded in any degree by deep X ray therapy. Sarcomata of the "Ewing" type are said to melt away under the influence of irradiation as osteogenic sarcomata never do, at all events for a time. So important a feature of Ewing's sarcoma is this initial prompt response to irradiation that as a diagnostic measure determination of the radiosensitivity of the tumour in its early stages is greatly to be preferred to surgical exploration undertaken to secure a biopsy specimen. The vital and well-founded objection to such surgical interference with a bone sarcoma is that incision of the periosteum merely removes that restraint which it is the object of the tumour to overcome, and a rapid advance in growth, with permeation of the soft tissues surrounding the bone, is prone to follow.

In employing the term "round-celled sarcoma" to describe the histological character of the biopsy specimen in the case of this boy and in adhering to it after the examination of further sections secured after the amputation, I violated the canons of the Registry of Bone Sarcoma. According to Boyd,¹ whose discussion of bone sarcoma is based largely on the registry material as reviewed by Codman, Ewing, Kolodny and Connor respectively, there is no such thing as a "round-celled" sarcoma of bone. The designation "round-celled" should have implied a tumour of the marrow, such as that of Ewing, or myeloma. Such was not my intention, for after careful study of the sections I was unable to reconcile the microscopic features of the neoplasm with those of either Ewing's sarcoma or myeloma.

Although the component cells were predominantly round, they exhibited a certain pleomorphism when studied closely, variations in shape which seemed sufficient to preclude a diagnosis of Ewing's sarcoma. The occurrence of tumour giant cells also seemed to render a histological diagnosis of Ewing's sarcoma untenable; yet there was no intercellular substance nor any evidence that the cells of the tumour, if osteogenic, had attained any degree of differentiation. They were, as I have indicated, generally round, but many on close inspection showed a short spindle form; they did not exhibit the clear cytoplasm or syncytial appearance of the cells of a Ewing's sarcoma.

In his well-known text-book Ewing gives a place to round-celled sarcomata of bone, stating that in many very malignant bone tumours the cells are of small size and assume a short spindle or rounded form. He doubts the wisdom of employing the term "round-celled", however, for reasons which he sets out in his treatise. In such small-celled tumours the cells are of short spindle form or, on cross-section, round or polyhedral. Such tumours are among the most anaplastic, actively growing and highly malignant of bone neoplasms.

I would submit that it is in this group that this tumour is to be placed. It showed no bone production, but is not thereby disqualified as an osteogenic sarcoma. That an osteogenic sarcoma necessarily produces bone is a common misconception. The word "osteogenic" means derived from bone, and Kolodny² defines the term "osteogenic sarcoma", in the sense in which it is employed by the Registry of Bone Sarcoma, as a sarcomatous tumour derived from ancestors of cells which, when duly differentiated, are known as osteoblasts. Production of bone is merely a potential ability of the tumour cells, which may or may not be exercised. In the majority of osteogenic sarcomata certain of the cells reach their ultimate goal and become bone cells, but in a few such tumours the cells seem to multiply too rapidly to permit of their getting beyond the most primitive stage.

In concluding the discussion on the nature of this tumour, the argument of which has centred round the question of whether it is an osteogenic sarcoma or an endothelial sarcoma of the Ewing type, I am fully conscious of the probability that, if the microscopic preparations were examined by a group of pathologists, some divergent opinions would be expressed. In the differentiation of neoplasms in bone many complex problems confront the pathologist. The frank osteogenic

sarcoma as a rule offers no difficulty, nor does the benign giant-cell tumour; but in the interpretation of the less differentiated and highly cellular malignant neoplasms the personal equation is bound to enter. Not all the contentious points are mere academic problems; some are of immediate practical significance. It is of some prognostic importance to distinguish between Ewing's sarcoma and osteogenic sarcoma, for, although in the ultimate prognosis there is little to choose between the two, the patient's expectation of life is as a rule a few months longer if the growth be of the Ewing type.

The pathologist must also endeavour to assess the rapidity of growth, using as his criteria such histological features as abundant mitoses, nuclear hyperchromatism, the occurrence of vascular channels and blood spaces bounded by tumour cells, the presence of necrotic areas in the absence of irradiation, and the degree of differentiation.

An apparent exception to the principle that a high degree of differentiation and the presence of "adult" cells in the tumour are indicative of a relatively slow course was furnished by the case of a girl, Elaine S., aged eleven years, who died at the Children's Hospital in July, 1937. Symptoms dated from mid-January of last year, osteogenic sarcoma in the distal end of the left femur was diagnosed radiologically in February, and death occurred on July 6, less than six months from the onset of symptoms. Considered with reference to the rapid course pursued by the neoplasm, the amount of "adult" tissue in the metastases was remarkable. Those in the lungs were cartilaginous and had a resilient quality; extensive ossification was present in a metastatic mass in the posterior part of the mediastinum, and attached to the diaphragm were plaques of dense and even eburnated bone.

The histological problems connected with bone sarcoma are not rendered any easier by the fact that primary malignant tumours of bone are comparatively uncommon, so that no individual pathologist, unless he has access to a large collection of such tumours, with all relevant microscopic preparations, gains a really comprehensive experience of them. The records of in-patients for the past fifteen years at the Children's Hospital, Melbourne, show only twelve examples of primary malignant tumours of bone, so that this dread disease may justly be said to be uncommon. No less than nine of the children thus affected have been aged between ten and twelve years; four only have died at the Children's Hospital, others having died at home or at the Royal Melbourne Hospital, whither they had been transferred for deep X ray therapy. It is of interest to note that Dr. R. J. Wright Smith identified Ewing's sarcoma in two of the children who died at the Royal Melbourne Hospital.

The Role of Trauma.

In the case of the boy in whom the tumour under discussion arose, trauma appeared to be an important adjuvant factor. It is frequently so in osteogenic sarcoma, and an almost constant apparent relation between trauma and Ewing's sarcoma has been observed. It will not be questioned that trauma, generally of a degree insufficient to cause a fracture, figures largely in the clinical histories of patients in whom bone sarcoma has developed; in fact, in sarcoma of bone, trauma has appeared to initiate the disease more frequently than in any other malignant condition, the next in order, perhaps, being carcinoma of the breast. In the present instance it would seem difficult not to admit that trauma played an important part. A heavy piece of wood fell on the dorsum of the foot; bruising resulted, and a fracture of the third cuneiform bone was detected radiologically. Six weeks later what appeared at first to be osteomyelitis, and was subsequently shown to be a highly malignant neoplasm, had developed. In these circumstances the *onus probandi* would appear to lie with those who would deny the aetiological importance of trauma.

The much-discussed question of the relation of trauma to malignant disease has been reviewed by H. M. Moran,² of Sydney. He points out that without doubt in very many cases the only part played by trauma is to reveal

and aggravate a preexisting condition; but he admits that in sarcoma of bone the history may at times be so highly suggestive that the possibility of a traumatic origin cannot be denied.

Kolodny,³ in his review of the registry material, is disposed to attach much importance to trauma as an exciting cause of osteogenic sarcoma. It cannot, of course, be the only factor, or bone sarcoma would be an extremely common disease. Consideration must be given to the countless blows, kicks and contusions of bones sustained with impunity in work and play by adults and children the world over. With innumerable such injuries leading to no result whatever, the conclusion is forced that when osteosarcoma does follow an injury there must be some constitutional predisposition on the part of the individual.

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- ² A. Kolodny: "Bone Sarcoma: Primary Malignant Tumors of Bone and Giant Cell Tumor", *Surgery, Gynecology and Obstetrics*, Volume XLIV, 1927, page 1.
- ³ H. M. Moran: "Trauma and Cancer", *The Journal of the Cancer Research Committee of the University of Sydney*, Volume I, Number 1, May 1, 1929, page 46.

PARAPLEGIA DUE TO METASTASIS FROM A SYMPTOMLESS, ALMOST INVISIBLE, BRONCHIAL CARCINOMA.

By ELIZABETH K. TURNER and RUPERT A. WILLIS.

(From the Baker Institute of Medical Research, Alfred Hospital, and the Pathology Department of the University of Melbourne.)

PULMONARY carcinoma, which until recent years was regarded as rare, is now notorious for the frequency with which it eludes correct clinical diagnosis, and often produces its first symptoms in prominent metastasis. With the present methods of clinical examination it may be impossible to detect the primary growth. Indeed, it may easily escape discovery at *post mortem* examination, unless it is searched for deliberately and with meticulous thoroughness, as witness the following case.

Clinical History.

A man, aged sixty years, who had been a tin and gold miner, was admitted to hospital on March 4, 1938, complaining of pain in the back and across the chest of six months' duration, with weakness in the legs and retention of urine of one week's duration. There was also a previous history of trauma to the back twelve years before, and of frequent pneumonic attacks, following influenza in 1919. No loss of weight had occurred.

On examination complete paraplegia of the lower limbs, with flaccidity of the muscles, was evident. The reflexes of the abdomen and lower extremity were absent, except the plantar reflex, which was extensor in type. Epicritic sensation was lost below the twelfth dorsal level, while below the sixth dorsal segment sensibility to pressure, pain and heat was lost. The cerebro-spinal fluid contained globulin and a few red blood corpuscles. Blood examination revealed no noteworthy abnormality.

Ten days after the patient's admission to hospital a rise in temperature occurred, with a cough. Many adventitious sounds could be heard over the thorax. The patient had extending sacral bed sores; and at about this period oedema of the legs occurred, with rapid upward spread. Retention of urine and faeces persisted, and blood and much pus appeared in the urine. Death occurred on April 25, 1938, seven months after the onset of symptoms. The clinical diagnosis was a spinal tumour, possibly secondary to a neoplasm of the kidneys.

Post Mortem Examination.

Macroscopic.

The spinal cord was compressed by an extradural mass, 4.0 centimetres long and 1.5 centimetres in main diameter, which projected into the spinal canal on the right side at the level of the third to the fifth thoracic vertebrae (Figures I and II). The growth was attached to the walls of the spinal canal, and was continuous via the intervertebral foramina (and probably also the *ligamenta subflava*) with a paravertebral mass of tumour seen in the thorax. The tumour was wholly extradural, but the corresponding area of cord was fixed to the deep surface of the indented dura by some filmy arachnoid adhesions.

In both lungs widespread bronchopneumonia was present, and in the main bronchus of the right lung there was a small, ill-defined, pale, slightly irregular area, flush with the mucosal surface and so inconspicuous that it was overlooked at first. There was no sign of growth beyond the bronchial wall, but the bronchial lymph glands contained small tumour deposits, and there were larger deposits also in the mediastinal and right lower deep cervical glands. Extending from the mediastinal deposits a nodular subpleural plaque of tumour lay on the right antero-lateral aspects of the third, fourth and fifth thoracic vertebrae, the bodies of which, however, were not invaded. The kidneys were enlarged and were the seat of extensive ascending pyelonephritis with abscess formation. In the heart some atheroma of the coronary arteries was seen. Thorough examination of all other viscera, including those of the head and neck, and of the brain, skull, vertebrae and ribs, revealed no noteworthy abnormalities.

Histological Examination.

Over the pale area in the right bronchus the normal bronchial epithelium was replaced by a microscopic layer of typical "oat-celled" carcinoma (Figure III). The submucosa beneath the affected area contained lymphatic vessels filled by solid columns of tumour cells (Figure IV). At the invading edge of the tumour the submucosa was hyperæmic, and there was an intense lymphocytic reaction. The peribronchial tissues and adjacent lung tissue contained no tumour. The lymph glands were heavily infiltrated with oval-shaped epithelial cells, principally occupying the cortical and medullary sinuses. In places distinct cancerous permeation was seen in both the afferent and efferent channels of the glands. Silicotic fibrous nodules also were present in the thoracic lymph glands. The extradural tumour consisted of carcinomatous tissue similar to that in the lymph glands, but more vascular, and with some multinucleated giant tumour cells.

Discussion.

In this case the primary growth itself played a clinically unimportant part, and a secondary growth was responsible for both the first symptoms and the eventual death of the patient. The primary bronchial growth was to the naked eye so inconspicuous that, though it was deliberately searched for after all the larger bronchi had been opened by longitudinal incisions, it was at first overlooked; and it was only because thorough examination of all other organs failed to disclose any other primary tumour that the bronchi were reexamined and the tumour was detected. As Figures III and IV show, it consisted only of a thin layer of cancerous epithelium replacing the normal respiratory epithelium in the affected area, with permeation of a few submucosal lymphatics. It is, we think, very unlikely that bronchoscopic examination during life could have discovered this almost invisible tumour. There were no bronchial stenosis, no ulceration, no projection of the growth into the bronchial lumen, only the slightest nodularity of the surface, and only the slightest pallor of the affected area. More than any other tumour we have studied or seen reported, this example shows how meticulous must be the search for a primary carcinomatous growth in cases of neoplasm of obscure origin.

The ætiology of bronchial cancer naturally remains obscure; and without making any deductions we merely

draw attention to the following facts regarding the case here reported: (a) the patient had been a tin and gold miner, and silicotic changes were seen microscopically in the bronchial lymph glands; (b) he had had frequent attacks of "influenza" since 1919; (c) he had smoked half a pound of black tobacco per week.

Summary.

A case is described in which fatal paraplegia resulted from a large extradural growth secondary to a small symptomless primary bronchial carcinoma. The bronchial growth, even at autopsy, was almost invisible to the naked eye, and indeed escaped discovery at the first examination of the bronchi. Possible ætiological factors in the case are mentioned.

Acknowledgement.

We are grateful to Dr. L. B. Cox for permission to record clinical details of the case.

A CASE OF CHORIONEPITHELIOMA OF THE TESTIS.

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Hobart.

Clinical Record.

R.S., a single man, aged twenty-two years, was admitted to the Royal Hobart Hospital on June 15, 1938. Eighteen months previously the left undescended testicle had been removed. There is no record of its structure. He had had good health until three weeks before admission, when he coughed up a little blood, and also noticed that his right foot was painful. A day or two later he noticed that his right testicle appeared to be enlarging and was slightly painful. This enlargement increased steadily, and he also suffered from pain in the chest and occasional slight hæmoptysis. He had lost at least 6.3 kilograms (one stone) in weight.

On examination pallor and loss of weight were evident. The right testicle was enlarged to twice its natural size, was heavy and not translucent. The corresponding inguinal glands were hard and large. Dulness to percussion of the thorax was present, particularly on the left side. Gynecomastia was present in both breasts, the breast tissue being about four centimetres in diameter, and the nipple prominent and dark. No secretion could be obtained from the nipple.

X ray examination showed many metastases in the lungs and an area of rarefaction in a tarsal bone of the right foot. Friedmann's modification of the Aschheim-Zondek test gave a strongly positive reaction.

Orchidectomy was performed on June 16. The testicle was oval in shape, and measured 7.0 by 5.0 by 5.0 centimetres. All the testicular tissue, with the exception of a thin strip 0.5 centimetre wide along one border, was replaced by dark reddish-blue tumour tissue. The cord was not thickened. A small hæmatocele was present. The inguinal glands contained similar dark tumour tissue. Death occurred on July 19, with the symptoms of intracranial hæmorrhage.

Post Mortem Findings.

Post mortem examination revealed that the abdominal aortic lymphatic glands contained tumour tissue. About ten nodules, one centimetre in diameter, were present in the liver. The lungs were occupied by many growths, varying in size from a rounded nodule, one centimetre in diameter, to a large confluent mass, six centimetres in diameter. All metastases were a reddish-blue colour, with small areas of scattered white tissue, firm in consistency, and rounded, but limited by the pleura. Pulmonary vessels were invaded. The thyroid contained one large metastasis, and there were about five small tumours scattered through the brain. Hæmorrhage from a metastasis in the brain into

the brain tissue and ventricle was the immediate cause of death.

Section of the tumours showed the histopathological appearances usually seen in chorioncarcinoma of the female, namely, masses of anaplastic spheroidal cells, many of which contained mitotic figures, syncytial giant tumour cells, with widespread hemorrhage and necrosis. The appearances shown in Figure I are characteristic of the general tumour structure. Two mitotic figures, asters, marked M, can be seen in the clear spheroidal cells. This photomicrograph shows also the extensive phagocytic response around the tumour margin. A similar response is present in the lung, where large pigment-laden monocytes, together with pigmented giant cells, are collected round the tumours. No teratomatous elements could be recognized in the areas of testicle sectioned or in the metastases.



FIGURE III.

Showing enlargement of breast tissue.

Examination of the breast showed recent hyperplasia, with abundant young areolar tissue of the active periductal type, and obvious multiplication of the ducts, the epithelial cells being of the tall active type. No lactating acini were found.

Summary.

The following points are of interest in the case presented: Malignant disease of the testicle was associated with non-descent of the opposite testicle.

The testicle was the seat of a rare tumour, identical in structure with the female chorioncarcinoma.

Rapid venous invasion occurred, giving lung and bone metastases before even the primary tumour was noticed.

The tumour produced the physiological features of pseudo-gestation in the male, as evidenced by the positive response to Friedmann's test and by the gynecomastia.

Acknowledgements.

I wish to thank Dr. C. Duncombe for permission to present the case history, and Dr. Willis for his assistance with the examination of the specimens.

Reviews.

MATERIA MEDICA.

THE fifth edition of Bethes's "Materia Medica and Drug Administration" is to hand.¹ It is a practical and useful work. The American method of spelling, however, is at times bewildering. For example, phosphorus is thus spelt, but sulphur, sulphates and so forth become sulfur, sulfates, sulfurus and sulfite. An excellent list of definitions is followed in the first part of the book, which is devoted to *materia medica*. The various drugs of which this part treats are arranged alphabetically and are illustrated with appropriate prescriptions. There are some notable

omissions, such as sulphanilamide, "Atebrin" and "Plasmoquin". The toxicology of the various drugs and preparations is not adequately described. For instance, ethylhydrocuprein hydrochloride is mentioned as being of value for pneumococcal infections of the eyes, but no reference is made to its own sinister possibilities.

In view of the considerable publicity recently accorded to *cannabis indica* and its habit-forming potentialities, it is surprising that this drug is not accorded more mention. It is correctly stated that tryparsamide has been suspected of causing granulopenia and that it has the characteristic toxic action of other arsenicals on the liver and other structures. It is also mentioned that the drug may cause amblyopia. Granulopenia following amidepyrine administration is mentioned. It is stated that bismuth subnitrate is the salt of common choice for the internal administration of bismuth—an observation which does not accord with the usage in the British Empire. It is remarked that "Yatren" (chiniofonum) administered for amoebiasis frequently causes diarrhoea, but is practically without toxic effect. No mention is made of histidine in the treatment of duodenal ulcer. The term "eucalyptol" is employed for a constituent of eucalyptus oil, the synonym "cinole" not being mentioned. Regarding the vexed question of whether codeine is prone to induce addiction, the author is on safe ground when he says that "it seems to have very little in the way of habit-forming quality".

The second part of the book is devoted to prescription writing, medical Latin, the choice of a vehicle for liquid preparations, solubilities and incompatibility. The third part contains numerous prescriptions, while an appendix gives problems and exercises on difficulties that are met with in everyday practice. A clinical index and a general index conclude the book. The text of the present edition has been made to conform to the United States Pharmacopoeia XI and the National Formulary VI. This publication is useful, but not of outstanding merit.

Notes on Books, Current Journals and New Appliances.

A NEW PLASTER BANDAGE.

WE have examined a new type of plaster bandage, known as "Castex", which has been brought to our notice by Messrs. Schaffer and Company, of Sydney. The bandage is said to be impregnated with synthetic resin, pyroxylin and a solution of boric acid in acetone. The pyroxylin is said to have a nitrogen content of only 12.5%, a factor that makes it less inflammable than ordinary collodion. The bandage is supplied in an airtight container. When applied to a limb it sets rapidly and forms a hard, light, durable, waterproof cast. It can be cut, removed and reapplied, without great difficulty. The dry cast is no more inflammable than an ordinary wooden splint. It is permeable to X rays.

A BOOK ON MASSAGE.

MISS C. I. CARPENTER's small book "A Practical Guide to Massage" is written in a philosophical vein and should be of service to medical practitioners as well as to nurses and those engaged in the practice of massage.² Most people know that massage is a useful form of treatment in certain conditions; but few pause to inquire why. In this book the physiological principles of massage are discussed and the effects of the various movements are simply and clearly explained. A third part is concerned with various disorders for which massage may be prescribed. The matter is attractively arranged and the book is readable and instructive.

¹"Materia Medica, Drug Administration and Prescription Writing", by O. W. Bethes, M.D., Ph.G., Ph.M., F.C.S., F.A.C.P., Fifth Edition, revised, 1933. Philadelphia: F. A. Davis Company. Medium 8vo, pp. 577. Price: \$5.00 net.

²"A Practical Guide to Massage", by C. I. Carpenter, with an introduction by D. Katz, Ph.D.; 1937. London: Baillière, Tindall and Cox. Demy 8vo, pp. 142, with illustrations. Price: 5s. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 19, 1938.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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ARTERIOSCLEROSIS.

PROBABLY no Shakespearean passage has been more often quoted than that in which Juliet asks "What's in a name?" But although the significance of a name might safely be discounted by a heroine of romance, in the practical sphere of scientific medicine uniformity and precision in nomenclature are of the first importance. In a consideration of a subject such as arteriosclerosis, a disease entity that more than any other operates to reduce the days of our pilgrimage below the allotted three score years and ten, and which rivals malignant disease in the volume of conjecture and hypothesis associated with its ætiology, a fundamental requisite is a clear conception of the meaning of the term.

Our attention has recently been arrested by an exceedingly well-produced thesis entitled "The Biology of Arteriosclerosis",¹ issued from the department of pathology of the Yale University School of Medicine, by M. C. Winternitz, R. M. Thomas and P. M. Le Compte, and from the subject matter of the study it would appear that the name arteriosclerosis was employed in a somewhat contracted

sense. We find a lucid exposition of the pathogenesis of atheroma, with its concomitant intimal sclerosis; but, unless it be by inference, the discussion does not embrace that diffuse fibrosis of the arteries which supervenes on medial hypertrophy and which we understand as arteriosclerosis. We venture the opinion that if the term "atherosclerosis" were substituted for "arteriosclerosis" in the title, it would more accurately define the scope of the work.

In a notable address delivered in Sydney by Sir Robert Muir, in December, 1936, our distinguished visitor drew a sharp distinction between the patchy and localized lesions of atheroma, primarily an affection of the intima, and the diffuse process of arteriosclerosis, intimately related to hypertension, which involves all the coats of the arteries in fibrotic change. We may therefore regard the thesis of Winternitz, Thomas and Le Compte as a study of the manner in which atheromatous plaques are initiated and evolved. In so doing we find a new line of approach to this problem, explored with ingenuity and clear thinking. The argument throughout is based on the conception that the vessel wall is itself a vascular tissue, which, as such, reacts to the entry of infective and other injurious agents in the same manner as other tissues. It is urged very strongly that arteriosclerosis, of the type already indicated as the main burden of the book, should be retrieved from the scrap-heap of degenerations to which it has long been relegated, and given a place among orderly and orthodox inflammatory processes. Any attempt to repudiate the admission of defeat or inertia implied in the complacent recognition of a disease process as a degeneration is to be commended. By the comparatively simple methods of clearing and injection Winternitz and his colleagues were enabled to observe those materials in the vessel wall which were expressions of disease, and to study the extent and distribution of the *vasa vasorum* in normal and diseased vessels. Clarification of the tissue also rendered it possible to select the most promising portions of the vessel wall for histological section. These three processes, clarification, injection and histological section, constituted the technical approach to the study.

¹ "The Biology of Arteriosclerosis", by M. C. Winternitz, M.D., R. M. Thomas, M.D., and P. M. Le Compte, M.D.; 1938. Springfield: C. C. Thomas. Medium 8vo, pp. 142, with illustrations of which many are in colour. Price: \$4.00 net.

Winternitz, Thomas and Le Compte have demonstrated an extensive vascular network in the walls of the normal blood vessels of a number of animal species and have traced the origin of these anastomosing mural vessels from three separate sources, namely, from the adventitia, from points just within the orifices of branches, and directly from the lumen of the vessel itself. An observation presented as of fundamental significance is that in diseased arterial walls in the human subject the number of *vasa vasorum* and the complexity of the designs in their anastomoses become greatly exaggerated. Enhanced vascularity coincides with disease of the vessel wall very strikingly and consistently. The recognition of the extent of these channels in the arterial wall suggests a new outlook on the reactions of the tissue to injurious agents. It is shown that the response to injury is effected through the capillary bed, and may be manifested by exudation or proliferation, with one or the other process predominating in varying degree. Haemorrhage is fairly regarded as the extreme of severity in the exudative reaction, which in its more usual expression is sero-fibrinous. The proliferative reaction consists in the formation of new blood vessels and connective tissue elements and an access of different varieties of mononuclear cells. The mononuclear cells display a remarkable facility for segregating lipid material, which they derive from extravasated red blood corpuscles or the serum lipoids in the exudate. Calcification takes its time-honoured place in the sites and products of old inflammation.

Many of the features of the focal lesions of atherosclerosis—exaggerated vascularity, subintimal haemorrhage in splashes of colour, which varied according to its age, intimal thickening and calcification—were observed by the simple process of treating a strip of vessel wall (after removal of the adventitia) with a clarifying agent, such as glycerine, and subjecting it to examination under a low magnification. Similar studies were carried out with segments of cardiac valves in conditions in which an infective origin has been established, for example, rheumatism and subacute bacterial endocarditis, with a significant parallelism between

the findings in these morbid states and those in atherosclerosis. Thus have been demonstrated increased vascularity, haemorrhage, exudation, proliferation. What is this if not the basic formula of inflammation, a process that retains its essential unity whether it be observed in the simplest form of coelenterate or in any of the diverse and complex tissues of man?

Of the illustrations accompanying the thesis it might be said in Hamlet's phrase that they "hold, as 'twere, the mirror up to nature", and their excellence speaks eloquently of an efficient department of medical art in the Yale University School of Medicine. It may be affirmed of books in general that no amount of gilt edging or lavishness of production will make them endure if they lack essential merit. One attribute of worth in a book is that it should awaken thought, and the thesis of Winternitz, Thomas and Le Compte must be allowed this quality. How much of the ultimate truth it embodies, whether a new planet has swum into our ken or merely a brilliant meteorite, will be shown in the course of time. In Emerson's striking words, "the permanence of all books is fixed by no effort, friendly or hostile, but by their own specific gravity, or the intrinsic importance of their contents to the constant mind of man".

Current Comment.

SEQUELÆ OF BLOOD TRANSFUSIONS.

Blood transfusion now occupies so important a place in the routine treatment of a number of serious medical and surgical conditions that it is now ordered almost as casually in large institutions as saline infusions were a generation ago. Its value needs no statement; its risk is trifling. Nevertheless, accidents have happened and a record of these is highly desirable. When blood transfusions are carried out by skilled clinical pathologists or by physicians or surgeons who have acquired a high degree of technical dexterity, trouble is very unlikely to arise; but some danger exists when emergency requires a practitioner of restricted experience to carry out the whole ritual of typing, collecting, mixing and delivering the blood to a patient. Further, the demand on hospital resident medical officers to perform transfusion is now very heavy, and it is therefore essential that even the

most junior of them should be thoroughly conversant with the whole procedure.

E. L. De Gowin describes a series of thirteen cases of grave sequelæ of 3,500 blood transfusions—a small number certainly, but one that is not negligible.¹ The allergic manifestations and the febrile reactions are not considered in this paper. Like the possibility of transmission of disease, they are taken for granted. All the transfusions were administered in well-equipped hospitals by the members of the intern staff under the supervision of the more senior resident medical officers. The typing of willing donors had been carried out by a medical officer of the bacteriological service, but the necessary cross-typing of patient and donor had been done by the intern. In nearly every case persons belonging to homologous groups alone were selected as donors, but in a few cases the blood of persons belonging to group O was utilized. The complications noted were renal insufficiency, hæmolytic reaction without renal trouble, pulmonary œdema and retinal hæmorrhage. Renal insufficiency is believed usually to follow hæmolysis, as in the case of blackwater fever, in which disease the renal tubules are thought to be choked with hæmoglobin precipitated in an acid medium. As De Gowin points out, there may sometimes be an alternative explanation, such as the setting free of a nephrotoxic substance, or the occurrence of renal urticaria or of vasoconstriction in the kidney. In some cases no incompatibility of bloods could be detected and hæmolysis was not always observed, though it should be remembered that hæmoglobinæmia can occur without the appearance of pigment in the urine. It is curious that five out of seven of the cases of renal insufficiency reported by De Gowin occurred in persons belonging to group O. Six of the seven patients died, though in fairness it must be realized that they were apart from the transfusions gravely ill. Three suffered from hæmolytic accidents, but no permanent harm resulted. Fatal pulmonary œdema occurred in two patients, but these were suffering, one from extensive thrombophlebitis, and the other from chronic glomerular nephritis; such grave diseases make this complication comprehensible. Retinal hæmorrhage after blood transfusions has been recorded. Two of the author's patients showed in addition some retinal vascular leakage. He describes a third suffering from a blood dyscrasia, in whom some retinal bleeding had been observed before the transfusion was given. He believes that seven of the patients died as a direct result of the untoward complications of blood transfusion.

De Gowin emphasizes the need for great care in preliminary typing. In particular he urges that the type of sera used should be of high titre. One donor in his series was thought to belong to group O, but later, when stronger sera were employed, it was discovered that he really belonged to group A. On the official hospital lists De Gowin has found the names of several other donors described as belong-

ing to group O, who on being retested were found to belong to other groups. Careful cross-matching of bloods is, of course, vitally necessary, and as this duty may devolve upon less experienced practitioners, it should be done with all possible care. The experience of this author, like that of others, points to the possibility that error even in standard cross-matching tests is not entirely negligible. In his clinic it has been found necessary to give special lectures and demonstrations to each successive batch of interns, a practice that might with advantage be followed in other centres. In this country blood transfusion demonstrations have frequently been the subject of post-graduate instruction, and the timely warning given in this article emphasizes once again the need for all practitioners who work in isolated communities to master the technique of this invaluable and often life-saving form of treatment. Now that the continuous drip transfusion of citrated blood has been reduced to a simple technique, this method also can be used in centres where a reasonably adequate equipment exists and where the practitioners concerned are thoroughly familiar with the procedure.

THE PHYSIOLOGY AND PATHOLOGY OF VITAMIN D.

A RECENT contribution by A. T. Shohl to the study of vitamin D is of interest.² He points out that this factor was at first believed to be a single substance. The active compound formed by the irradiation of ergosterol was thought to be identical with the anti-rachitic agents which are present in certain natural products or are formed in animals or foods by ultraviolet radiation. It has been found, however, that different sources of vitamin D have different relative values, which become apparent when the products are tested simultaneously on rats and chickens. Further, several different sterols, carefully purified, can be activated by various methods. The multiple nature of vitamin D has been established and ten different substances capable of exerting a physiological effect have been described. At the present time vitamin D can be detected only by its preventive or therapeutic effect on rickets; hence different sources of the substance have qualitatively the same effect on the animal body. L. J. Harris has shown that there is no reason for the belief that vitamin D promotes calcification by direct action on bone cells. Its action is so to alter the body fluids that bone salts may be incorporated into the growing bone. Rickets is the expression of a fault in the metabolism of calcium and phosphorus, and in this sense it is the cause and not the result of the bony lesion. Precipitation of minerals in rachitic cartilage will occur *in vitro* in the presence of normal serum or of properly constituted inorganic solutions. As Shohl points out, this does not mean that bone formation is an inorganic process. It occurs in the

¹ *Annals of Internal Medicine*, April, 1938.

² *The Journal of the American Medical Association*, August 13, 1938.

living cell, and the proper type of cartilage degeneration is necessary for the entrance of the blood vessels. What takes place in the space between the cells is not known, but an appropriate inorganic environment is necessary for deposition of bone. Only when adequate concentrations of calcium, phosphate and carbonate ions are present can precipitation of the salt occur. It has been demonstrated that the greater part of the serum calcium is combined with protein. Phosphatase has the property of splitting organic phosphorus compounds, such as hexose phosphate, into inorganic phosphate. This enzyme occurs in greatest quantity in the cartilage, but it is also present in the kidneys, the bowels and the blood serum. The function of phosphatase in the serum is unknown. The acid-soluble phosphorus exists almost wholly as inorganic phosphate. According to H. D. Kay, the serum phosphatase represents a leakage from the tissues where it is in excess. It may deal with the correction of phosphates by elimination through the kidneys or bowel or by metabolism within the cell. Shohl considers that such a liberation of phosphate may be a step in the mechanism of carbohydrate metabolism or an adjuvant to muscle function. If phosphorus esters were present in bone tissue, the local increase of inorganic phosphate would be an important preliminary to the precipitation of calcium phosphate. In diseases of the bone, especially the resorptive lesions in which osteoblastic activity is enhanced, the phosphatase of the serum is increased. This occurs in rickets and is possibly the first definite evidence of the development of the rachitic condition. In active rickets the phosphatase content is high, but when vitamin D is administered it diminishes towards normal, although more slowly than the other values. Phosphatase may not become normal in concentration until several months after evidence of healing has been manifest. Its increase in "low phosphorus rickets" is a protective mechanism.

When great excess of vitamin D is given, there arises a pathological condition of hypervitaminosis D, which is an exaggerated form of the physiological or therapeutic effect of the vitamin. The calcium and the phosphate concentrations in the blood are elevated beyond normal. Calcification proceeds at an increased rate and the deposition of minerals at the provisional zone of calcification is generally dense. When the dose is great enough—about one thousand times the therapeutic dose—deposition of minerals at the epiphyses occurs at the expense of that in the shaft. The balance of calcium and phosphorus becomes negative. Metastatic calcification now occurs. As is well known, the parts most affected are the tubules of the kidneys, the blood vessels, the heart, the stomach and the bronchi. Irritation and degeneration supervene in these organs and in the liver. The animals rapidly lose weight, suffer from severe diarrhoea and succumb in from five to fourteen days. When lesser quantities are administered the animals survive altogether or live longer. The survivors still exhibit the lesions

six months after the experiment. Healing of rickets is promoted by diets that are deficient either in calcium or in phosphorus. Calcification is less intense and more delayed, but the degenerative changes are as severe as those found in animals fed on a normal diet.

The metabolism of vitamin D is not only interrelated with calcium and phosphorus, but is also dependent on the acidity of the diet. It is a common belief that acidity is associated with rickets and alkalinity with tetany. True acidity exerts its effect mainly on absorption from the intestinal tract. On the acid side absorption of calcium and phosphorus is facilitated, while on the alkaline side it is retarded or inhibited. The potential alkalinity or acidity of a diet depends on the amount of alkaline elements (calcium, magnesium, sodium and potassium) or of acid elements (chlorine, sulphur and phosphorus) which it contains. Shohl points out that diets which produce rickets exert a profound influence on the bodily economy. This is shown by their effect on the blood serum content of calcium and of inorganic phosphate. Generally the composition of the blood serum in this regard reflects the composition of the intake. In clinical rickets there is an increase in the excretion of calcium in the faeces, while the quantity in the urine, which is generally small, is further diminished. Elimination of phosphorus in the faeces is likewise conspicuously augmented and may be even greater than the loss of calcium. In infantile rickets both the calcium and the phosphorus balance are below normal. The effect of administration of vitamin D is remarkable. The blood serum is restored to its normal content of calcium and inorganic phosphate, and the metabolism is greatly altered. The amount of calcium and of phosphorus in the faeces becomes reduced, while the quantity in the urine increases. Retention is also increased. In experimental rickets the retention values indicate the amounts of calcium and of phosphorus in the diet. When vitamin D is given the blood serum values approach normal. Shohl suggests that, although both vitamin D and the parathyroid hormone raise the level of calcium and of phosphorus, the action of each is different. The parathyroid acts more specifically on the serum calcium, and only when toxic doses are given, is the effect in raising the toxic level pronounced.

BILE AND PEPTIC ULCER.

As we are still assiduously seeking the cause of peptic ulcer, any additional enlightenment of the problem is ever welcome. Further, since the treatment of the condition is even yet not satisfactory, an improvement in therapeutic methods is urgently desired. E. S. Emery, junior, and M. A. Schnitker record their investigations on the administration of bile to patients suffering from peptic ulcer.¹ They

¹ *Annals of Internal Medicine*, May, 1938.

state that experiments on animals furnish evidence that ulceration of the stomach or duodenum may result from the diversion of bile from the duodenum and that various investigations indicate that ulceration has followed interference with the normal secretion in the duodenum. Experimental methods that have been most successful in evoking peptic ulceration in animals (chiefly dogs) have involved the side-tracking or exclusion of the flow of bile or pancreatic juice to the duodenum or deliberate damage to the liver by the use of chemical poisons, such as cinchophen. The various experiments may be divided into three groups. In the first the duodenum is separated from the stomach. This procedure prevents the normal mixing of hydrochloric acid with the duodenal secretions, which include *succus entericus*, bile and pancreatic juice. In the second only one of these secretions is experimentally diverted. In the final experiment the liver is subjected to injury. It has also been observed, both in man and in animals, that spontaneous ulceration is associated with liver disease. The belief has been held that ulceration possibly results from a defect in the process of neutralization of the gastric juice by the regurgitated alkaline content of the duodenum. Emery and Schnitker consider that their observations support the hypothesis that the mucosa can be damaged by unneutralized hydrochloric acid. At the same time they find it difficult to apply the interpretation of these results to an explanation of the cause of ulcer in man. They hold that the damaging effect of the acid cannot be considered apart from the resistance of the mucosa to this action. They admit that most investigators have believed that trauma and the resistance of the mucosa are important factors determining the development of experimental ulcers. During their investigations they found that the tying-off either of the biliary or of the pancreatic duct might be followed by ulceration. Which of these two procedures is the more important has been a subject of much controversy. Emery and Schnitker consider that the loss of bile is more serious than the loss of pancreatic juice. They state that our knowledge of peptic ulcer divides our hypotheses of its aetiology into two groups. In the first the view is held that ulcer is due to the destructive effect of hydrochloric acid on a normal mucous membrane. The second attributes the condition to a local diminution of resistance of the tissues to peptic activity of the gastric juice. There is certain evidence that peptic activity does play a part in the development of ulcerous lesions, but there is no evidence that it is the only cause. Emery and Schnitker insist that, if the ulcer is associated with the hydrochloric acid, then changes in the activity of the ulcer must be associated with a change either in the acid or in the resistance of the tissues to the damaging or corrosive effect of that acid. There is no evidence that the quality of human gastric juice varies with a change in the state of the ulcer. This would be essential if the destructive effect of the juice were the important factor in the development

of the condition. Recent experiments indicate that there is no change in the quality or quantity of human gastric juice from the period of a pre-ulcerous condition of the mucous membrane to the time when a lesion is demonstrable. Further, in many cases of ulcer the juice has low acid values. Evidently there is something in addition to the destructive effect of hydrochloric acid which determines ulceration. It is pointed out that the progressive susceptibility of the lower intestine to the corrosive action of the gastric juice suggests the importance of the normal resistance of the tissues to this damaging influence. Emery and Schnitker find it difficult to believe that the factor of safety in the mechanism for neutralization of the hydrochloric acid is so slight that a diversion of either of the alkaline juices suffices to leave the duodenal mucosa unprotected. Other hypotheses, including the neurogenic, the vascular and the infectious, imply the existence of diminished tissue resistance. Experimental ulcers resembling those of man have been caused only by procedures similar to the Mann-Williamson operation. This fact does not support the neurogenic, vascular or infectious hypotheses. All experimental work based on the operative principle stressed by Mann and Williamson necessarily interferes with the normal physiological activity of the gastrointestinal canal. Possibly ulcer formation may be connected with a digestive disturbance, which results in some deficiency.

Emery and Schnitker administered bile to patients suffering from peptic ulcer on account of the various reports of cases in which lesions of the gastric or duodenal mucosa, in animals as well as in man, have been associated with interference with normal biliary flow into the duodenum. They considered the absence of bile to be a more important factor in the genesis of ulcer than loss of pancreatic juice. They believed that peptic ulcer might be a form of "deficiency" disorder in which a loss of the protective power of the duodenal mucosa permitted ulcer formation. They maintain also that studies of the bile of patients suffering from duodenal ulcer have demonstrated an abnormality of this fluid. They treated with bile forty patients suffering from peptic ulcer for periods of up to two years. Four of the patients had gastric ulcers, thirty-two had duodenal lesions, and four had both. Of these forty patients, twenty-three were treated with bile alone and seventeen with both bile and alkalis. Nine of them responded excellently to treatment, twelve well, nine fairly and the remaining ten not at all. These figures prove that desiccated ox bile is not a specific cure for the disease. However, the authors consider that bile may help to alleviate the symptoms of some patients in whom the use of alkalis is contraindicated. They state that it is virtually axiomatic that ulcer patients may be given almost any kind of food and that a certain number will respond favourably. The literature reports excellent results from numerous and diverse methods of treatment.

Abstracts from Current Medical Literature.

DERMATOLOGY.

The Treatment of Mycotic Infections.

DOUGLAS T. PREHN (*The Journal of the American Medical Association*, August 20, 1938) describes a treatment for superficial fungous infections of the glabrous skin. He discusses the frequency of occurrence of mycotic skin disease, with the aid of statistics quoted from papers published in several journals, and in particular makes use of the figures obtained from the medical reports of the United States Navy. Of 1,500 naval ratings examined, 92% were found to be affected in varying degrees of severity. He reviews at some length the clinical appearance and differential diagnosis of the types of disease encountered. An analysis is next made of the efficacy of the numerous therapeutic agents that have been recommended by others. In the author's experience few good results were obtained with these methods. In particular he made tests on 520 men in the Fifteenth Destroyer Division, United States Navy, stationed in the Far East. Ninety-three per centum were found affected with so-called athlete's foot. A strict régime of daily foot-baths in a solution of sodium thiosulphate, together with boiling of socks and cleansing of shoes, after five months' failed to reduce the incidence of infection below 25%. A detailed criticism is made of several of the more popular remedies for mycotic skin infections. Ointments are held to be unsuitable on account of the soiling of apparel, the tendency to damming up of secretions, the tendency to spreading widely in summer *et cetera*. Other undesirable features are discussed in connexion with lotions and dye paints. The author describes a treatment which he has evolved. He recommends the use of a powder consisting of salicylic acid, boric acid, camphor, menthol and starch. He states that the ingredients have a synergistic action, allowing amounts of salicylic acid larger than the usual 5% without interfering with the analgesic properties of the preparation. The method of application is important. According to the severity of the infection, the powder is to be rubbed into the skin daily or more often. The roofs of pustules or bullae must be cut away and loose skin removed, the powder then being thoroughly triturated into the diseased and adjoining skin. The treatment should be continued for several weeks after the lesions have apparently cleared up, and the preparation should then be used as a prophylactic weekly or even monthly. No harmful effects were seen on the clothing. The

formula recommended for routine use is salicylic acid, 5 grammes, menthol, 2 grammes, camphor, 3 grammes, boric acid, 50 grammes, and starch, 35 grammes. Trial of the treatment on 576 men is described. From ten days to two weeks after the commencement of treatment the incidence was reduced to 30%. After one month the incidence fell to less than 5%, and in two months from the initial treatment no cases were discovered. A gratifying feature was the excellent cooperation of the patients.

X Ray Epilation of the Scalp.

S. COCHRANE SHANKS (*The British Journal of Dermatology and Syphilis*, August-September, 1938) describes the four-area method in X ray epilation of the scalp. He briefly discusses the Klenböck-Adamson technique for scalp epilation, and draws attention to a previous paper by Molesworth, which attacked the theoretical foundations of this technique. The views expressed in this paper are accepted by the author, who proceeds to describe some experiments carried out by himself, in order to attempt to confirm by practical measurements the theoretical disadvantages of the Klenböck-Adamson technique. In this latter method there are four areas of triple overlap of the X ray beam. Briefly the author's method consisted in estimating the dose falling on the overlap areas by a second "Mekapion" dosimeter, previously calibrated against one used to measure the dose at the centre of each of the five fields. The rating of his equipment was as follows: 95 kilovolts, 2 milliamperes, 20-32 centimetres target skin distance, 0.5 millimetre aluminium filter, dose 340 r. The epilating dose from the apparatus for a single area was 400 r. The dosage recorded in an overlap area was 669 r; it thus received 1.67 times the epilating dose or 1.97 times the centre dose. The author then proceeds to describe similar dosage estimations with a four-area technique, similar to that recommended by Schreus. In this case only two areas of triple overlap occur, of smaller area compared with the Klenböck-Adamson method. In the experiment the dosage given at each of the four areas was slightly higher than in the case of the five-area technique. The figure for the dose received by the area of triple overlap was 1.45 times the centre dose or 1.30 times the epilating dose. The author decided to adopt the four-area method at the Goldie Leigh Hospital, and has tabulated the results of treatment of one hundred patients. Since the adoption of the method certain modifications have been found necessary. With the aid of diagrams and photographs the author describes the details of the method, with the modifications found desirable according to the shape and size of the head treated. A dose-for-age table is set out for the areas concerned. The article concludes by pointing out the greatly reduced

dosage on the overlap fields despite an increase in the centre dose for each of the four areas compared with that given in the original experiment. The greatly increased factor of safety is stressed, and for this reason the author recommends this method for X ray epilation of the scalp.

Erosions of the Oral Mucosa and Urticaria of the Body following Small Doses of Sulphanilamide.

An instance of erosion of the oral mucosa with generalized urticaria following small doses of sulphanilamide is reported by Noun (*Archives of Dermatology and Syphilology*, June, 1938). A female patient, aged thirty years, was treated for sinusitis by the administration of sulphanilamide. A dose of 0.3 gramme was given by mouth daily for eleven days, then 0.7 gramme daily for five days. On the fifth day after the dose had been increased the patient complained of intolerable itching of the body and soreness of the mouth. Urticarial lesions were present, involving the face, neck, trunk and lower extremities. In the oral mucosa were scattered pea-sized lesions, with clearly defined edges and a central reddish-grey exudate. Several attempts to isolate the organisms of Vincent's angina were made without success. A blood count revealed no abnormality. Five days after the appearance of the urticarial rash the patient complained of nausea and diarrhoea. The administration of sulphanilamide was discontinued. The skin condition was treated with oatmeal baths and a soothing lotion. An alkaline mouth-wash was prescribed. The urticarial lesions disappeared in seven days, the lesions in the mouth in twelve days.

Citrus Fruit Dermatoses.

HERMAN BEERMAN, GEORGE H. FONDE AND J. LAMAR CALLAWAY (*Archives of Dermatology and Syphilology*, August, 1938) subdivide and classify varying skin disorders due to the handling of citrus fruit. The article contains numerous case reports and an extensive survey of available literature. The dermatoses are set out under four headings: (i) the true allergic reactions; (ii) the reactions due to mycotic or parasitic contaminants; (iii) the reactions due to dyes or preservative contaminants; and (iv) the pseudo-allergic reactions. The factors under the first heading are very complex. Sensitivity may exist to the whole group of fruits or to individual varieties and to varying substances or parts of the fruit, while the allergen may be brought into contact with the body by way of the skin or the nasal and oral mucosae. The sensitivity may be localized to various parts of the body, may remain for some considerable time, and may be provoked once more by another and different portal of entry. Generally the eruption has the features of a contact dermatitis, but other eruptions,

for example, urticaria, are not uncommon. With regard to the mycotic and parasitic contaminants, a yeast-like organism is believed to be the offending factor and appears to affect those handling the pulp and juice of the fruit. Confusion is said to be possible between a true contact dermatitis and dermatophytides of the fingers in the presence of a positive response to patch tests with orange. Under the third heading (dyes or preservative contaminants) the list of offending substances ranges from artificial ripeners and improvers to fungicidal and insect sprays. One substance used ("Yellow OB") is chemically related to a dye used in the leather trade and known to produce dermatitis. This dye is present only on the peel surface, is not an essential irritant, and produces an eruption only after constant and repeated exposure, or in cases of idiosyncrasy. Under the subdivision of pseudo-allergic reactions are discussed several patients and laboratory subjects in whom results were equivocal. For example, instances of the occurrence of positive reactions to patch tests were cited, in which prolonged removal of the incriminated substance failed to effect a cure. In the course of the latter experiments it was shown that oil from lemon peel, in the concentration used for patch testing, might be a primary cutaneous irritant, in contrast with the oil of the other citrus fruits.

UROLOGY.

Dietetic Treatment of Oxalate Calculi in the Urinary Tract.

E. LJUNGGREN (*Zeitschrift für Urologie*, April, 1938) discusses the problems of diet and vitamin intake in connexion with the prevention of the recurrence of oxalate calculi. He states that it has been shown that the magnesium content of the diet is of great importance. When this is low, the magnesium content of the urine falls, and with it there occurs a decrease in the ability of the urine to keep calcium oxalate in solution. When the magnesium supply is exceedingly low, metabolic disturbances occur. On the one hand the calcium balance becomes negative and calcium excretion through the urine is increased, while on the other hand more oxalic acid is excreted than when a more balanced diet is taken. When the diet is very deficient in minerals and at the same time relatively lacking in vitamins A and D, the elimination of calcium and magnesium from the diet causes a partial diminution of this enormous calcium excretion in the urine. Simultaneous administration of vitamins A and D, however, will cause the urinary calcium excretion to fall to a normal level. When the patient is ingesting insufficient calcium and at the same time suffers from lack of vitamins

A and D, the skeletal calcium is mobilized. This mobilization is irregular and uncontrolled, and leads to increased calcium excretion in the urine. The older idea of withholding calcium-containing foods, such as milk, is therefore erroneous, since the calcium balance must be kept in equilibrium. The dietetic principle to be followed is to give the patient an adequate supply of calcium, magnesium and phosphorus in easily absorbable form, together with a sufficiency of all necessary vitamins. Foods rich in oxalic acid must be avoided. The patient should be given a full mixed diet, into which the following components must enter: milk, up to one litre per day; butter, and not margarine (the former contains vitamin A as well as fatty acids which are concerned in calcium exchange); wholemeal bread, provided digestive disturbances do not cause intolerance of this food; vegetables of all kinds, with the exceptions mentioned below, raw or ingested together with the water in which they are cooked (for otherwise magnesium is lost, as it is easily dissolved out of the vegetables by the water); fruit, especially oranges and lemons and other fruits rich in vitamin C; meat extracts and broths, which contain magnesium; vitamin D in the form of suitable fish, such as herrings; also, in the cooler part of the year, fish liver oil, containing vitamins A and D. For the purpose of encouraging vitamin D formation in the skin, sunbathing is advised. Vitamin B is obtained from wholemeal bread or, if this is not suitable, from preparations of wheat germ. Foods rich in oxalic acid, such as rhubarb, cocoa, chocolate, strong tea and spinach, are forbidden. Continued use of paraffin oil is deprecated, as it dissolves fat-soluble vitamins and washes them out of the body.

Pathogenesis of Renal Insufficiency in Bladder Disturbances.

N. HORTOLOMEI, M. STREJA AND T. BUNGHELE (*Zeitschrift für Urologie*, April, 1938) contribute a study of the problems of renal insufficiency arising from disturbances in the emptying power of the bladder due to obstructions in the urethra or bladder neck. By cystometric studies they have determined that the internal vesical pressure under normal conditions varies from 0 to 25 centimetres of water, immediately after emptying and with a full bladder respectively. In obstructive cases the corresponding range varies from 3 to 50 centimetres of water pressure. The problem was how to discover what happened in the upper part of the urinary tract during such variations. Excretion urography has disclosed slight dynamic alterations in the upper part of the urinary tract, even in the earliest stages of obstructive vesical lesions. In later stages of obstruction, definite dilatations of the ureter appear; such dilatations are more

pronounced when infection is present, and result from toxic paresis of the ureteric musculature. It has been determined that a reflex automatic mechanism exists between bladder and ureter, as regards their internal pressures, to ensure that the pressure in the ureter shall not fall below that in the bladder, a circumstance which may allow ureteric reflex. Even slight augmentation of the intravesical pressure causes a corresponding increase of the intraureteric and therefore of the intrapelvic and intracalcine pressure, with consequent slight but definite damage to the kidney. If this conception of a continued protective reflex is understood, it is easy to realize how, with an early obstructive lesion, the bladder may be able to empty itself completely and yet some renal damage be done. In this way also it can be understood how the simple application of bladder drainage by retained catheter can cause a lowering of the tension in the whole urinary tract, with consequent amelioration of the renal insufficiency.

Incrusted Cystitis.

F. MADDALONI (*Urologia*, March, 1938) considers that incrusted cystitis is a malady that has not yet been fully investigated from the urological side. It is probably owing to this incomplete understanding of the disease that frequent relapses are observed after treatment. The author considers that the optimum treatment is cystotomy, with curettage of the heaped-up incrustation, followed by light electrocoagulation of the superficial ulcerations beneath them. The bladder is drained suprapubically for a fortnight by means of a de Pezzer tube, while local and general acidifying methods are employed. The author does not believe that any particular germ, such as the *Bacillus proteus*, can be regarded as the specific cause of this particular variety of cystitis, but states that any of the usual pyogenic organisms may be concerned.

Subcapsular Renal Hæmatoma.

W. M. COPPIDGE (*The Journal of Urology*, June, 1938) reports a case of spontaneous subcapsular renal hæmatoma with an unruptured capsule. This condition appears to be a rare one, in which the renal function tests and pyelograms reveal no abnormality, in spite of pain, a palpable tumour and a radiographic shadow in the renal region. Nephrectomy was performed by this author with a favourable result. The kidney was almost denuded of its capsule, which had, however, remained intact. Microscopically it was found that intercapillary glomerular nephritis was present, although there was no clinical evidence of nephritis or arteriosclerosis. The hemorrhage is attributed to the vascular lesions combined with a high intrarenal blood pressure.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on May 28, 1938, at the Horsham Base Hospital. The first part of the meeting took the form of a number of clinical demonstrations by members of the honorary staff. A report of this part appeared in the issue of November 5, 1938.

Non-Surgical Drainage of the Alimentary Tract.

Dr. W. R. ANGUS read a paper entitled "Non-Surgical Drainage of the Alimentary Tract (Lyon Technique)" (see page 845).

PROFESSOR R. MARSHALL ALLAN said that the subject matter of Dr. Angus's paper served to remind those present of the physiological basis of some of the conditions encountered in practice. Dr. Angus had quoted J. W. Long as an authority, but Professor Marshall Allan could recall an earlier authority in Dublin, where the use of Epsom salt and the stomach tube had been advocated in eclampsia for a great many years before Long's paper appeared. Professor Marshall Allan had been taught to wash out the stomach and leave a magnesium sulphate solution in it. The patients used to receive plenty of raw cabbage and similar food, but very little meat. In the treatment of hyperemesis they had probably forgotten about drainage of the biliary tract in present-day methods. Bethel Solomons, at the Rotunda, used to adopt surgical drainage. After hearing what Dr. Angus had said that night, Professor Marshall Allan would be stimulated to use non-surgical drainage in the treatment of patients with hyperemesis who were not responding satisfactorily to the more orthodox procedures. He expressed his appreciation of the amount of work behind Dr. Angus's paper, and pleasure that Dr. Angus could keep up his scientific interests in the midst of the routine of general practice.

Dr. ERIC COOPER said that in 1917 Meltzer had stated that the theory of reciprocal innervation applied to the gall-bladder. The consensus of modern opinion was that the gall-bladder and the hypothetical sphincter of Oddi had no communication, even by hormone activity, and that the distended gall-bladder was quite incapable of altering its size. The "A", "B", and "C" bile specimens of Lyon were probably merely dilution effects, as had been suggested by Einhorn. The same effect could be obtained in animals without a gall-bladder or in human subjects after the gall-bladder had been removed.

Dr. Cooper went on to say that Lyon's method certainly had some value in diagnosis and in treatment. A patient with symptoms suggestive of gall-bladder disease had not necessarily merely a functional basis for the symptoms if organic disease appeared to be excluded by the radiographic evidence. The gall-bladder might empty after a fatty meal and still be in a pathological state. By microscopic examination of the bile obtained by Lyon's technique it might be possible to diagnose the presence of a pathological condition in the biliary tract. Among the patients who were more difficult to treat were the odd dyspeptics. It was easy to label their condition as functional. The psychological effect of passing the duodenal tube might prove very satisfactory in practice. Passing the tube was unpleasant, but the patients grew accustomed to it. The other methods were to give the patient, while in a fasting state, magnesium sulphate solution or injections of pituitrin, when good bile drainage resulted.

The school to which Wangenstein belonged had done much fine work. They used a bladder filled with water, attached to the duodenal tube, which was passed along the alimentary canal, sometimes even as far as the ileo-caecal valve. Samples could be taken at various stages, and in the event of the presence of an obstruction, a radio-opaque substance, such as a preparation of barium, could be placed at the site of obstruction. In conclusion Dr. Cooper

expressed the view that the development of the technique discussed by Dr. Angus might make an addition to the science of medicine.

Dr. JOHN O'SULLIVAN said that he took a personal interest in the subject, as he had been submitted to the technique twice in Berlin and had had his gall-bladder removed. The method was one that should be encouraged, but he wished to dispute some statements made by Lyon. The presence of magnesium sulphate solution in the duodenum would not make the gall-bladder contract. He had confirmed this fact by combining the procedure with radiographic visualization of the gall-bladder. Fats, fatty acids and choline were more powerful in that respect. He had seen small gall-stones forced out of the gall-bladder and passed in the stool as a result of the use of oleic acid and choline. The gall-bladder could be seen radiographically to contract; and in his opinion the fat was the most important thing in cholecystography. A normal cholecystogram could be associated with a pathological state of the gall-bladder. Indeed, it was quite usual to get a good dense outline with gall-stones in it.

Drainage of the duodenum and small bowel was of value. Within six weeks Dr. O'Sullivan had seen three patients with acute pancreatitis who had had that form of drainage with distinct benefit.

Dr. A. I. CHAPMAN, after expressing thanks to Dr. Angus, said that the treatment seemed to be practicable and simple, and that he would have liked to hear more about the results that had been obtained. Some of the claims made seemed extravagant, from both the physiological and logical aspects. The effect on migraine and in eclampsia and in certain borderline conditions of the biliary tract were examples of the type of information Dr. Chapman was seeking.

Dr. J. LE N. KNEEBONE said that he considered duodenal drainage to be a life-saving method of treatment after operations for intestinal obstruction. With the advent of duodenal drainage a number of lives must have been saved in the world every day. It was advantageous to combine with the drainage the intravenous administration of glucose and saline solution. He had not adopted the method of continuous drainage only because he had not gone to the trouble of setting up the apparatus. He would like to know whether the tube often became blocked.

Dr. STANLEY WILLIAMS referred to the value of passing the duodenal tube through the nose, particularly if it was to be left in position long, as in ileus. He also drew attention to the convenience of using the "Solvac" machines when combining continuous intravenous administration of glucose and saline solution with duodenal drainage. By altering the position of a tube the apparatus could be used for continuous washing out instead of continuous drainage.

Dr. A. E. COATES spoke of the value of clinical research work in general, with special reference to the work of Dr. Angus. He also compared the importance of the increasingly frequent use of the stomach tube and other rubber tubes by surgeons with that of the use of stethoscopes by physicians. The duodenal tube was more refined than the stomach tube, though it should not be forgotten that the latter was capable of passing through the pylorus. At the Royal Melbourne Hospital, when the duodenal tube became blocked on being passed through the nose, they had to resort to the use of a soft stomach tube. They used to perform jejunostomy frequently in the past, but mechanical drainage had largely replaced that operation. The fluid lost was returned by the continuous intravenous administration of saline and other solutions. At times when surgeons were asked to undertake the removal of the gall-bladder in cases in which little evidence of a pathological condition had been proved, it was wise to refuse and to refer the patients back to the physicians for mechanical drainage. Bad results were likely if, after operation, adhesions were formed in the gall-bladder fossa and no grossly diseased tissue had been removed. There was a group of patients that should not be treated surgically.

Dr. Angus, in reply, said that he had purposely avoided statistics of results because he was conscious of the inadequacy of the number of patients in his series. Migraine, inasmuch as it caused severe headache and constipation, diminished considerably when the biliary stasis was relieved. He had been unable to check the physiological claims of the experts in the articles he had read. The bile from the ducts was yellow in comparison with the dirty material from the gall-bladder. He was interested to hear from Dr. O'Sullivan of the radiographic verification of gall-bladder contractions. He had noted Lyon's statement that the tube at the sphincter of Oddi was better placed than one in the gall-bladder itself. In conclusion Dr. Angus stated that Murphy's proctoclysis was still a useful and reliable method for country general practitioners, and took the place of continuous intravenous administration of fluid, the technique of which had been so ably described by Dr. Ian Wood in a recent article. It was, however, more suitable for use in a big town or country hospital.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, East Melbourne, on June 1, 1938, Dr. F. L. DAVIES, Senior Vice-President, in the chair.

Medico-Legal Risks in Medical Practice.

DR. C. H. DICKSON read a paper entitled "Medico-Legal Risks in Medical Practice", on behalf of Dr. D. MURRAY MORTON, President of the Medical Defence Association of Victoria, who unfortunately was unable to be present. This paper was published in the issue of September 17, 1938.

Dr. R. C. BROWN referred to Dr. Murray Morton's paper as practical and thoughtful. He said that the purpose of it appeared to be mainly instructional, but it also served to remind members of the necessity for and advantages of joining the Medical Defence Association. Dr. Brown was not prepared to go so far as Dr. Morton in suggesting that the medical profession was so destitute of public regard, and he instanced the numerous ways in which the work of individuals had been generously recognized. The influences of highly placed people and of the weight of numbers were reflected at times in governmental actions that seemed unreasonable to medical scientists. It was not only among the poor and ignorant that there was much to be said for quackery. Recently a British parliamentary commission had conducted a lengthy inquiry into the scientific pretensions of osteopathy, which must have seemed unnecessary to men of scientific training.

Dr. Brown regretted that the new rule of procedure in trial by jury at common law had become a political matter. The trouble was that the medical practitioner was exposed to a heap of legal risks mostly because of his obligation to use a reasonable amount of care and degree of skill in the treatment of a patient. The degree of skill was supposed to vary with his professional standing and the branch of the profession to which he belonged, and to certain other circumstances. An alert clever judge was much more likely to arrive at a correct assessment than was a jury, which might be biased sentimentally, and in any case had not the mental training necessary for a true appraisal of the amount of skill needed and used in the varying circumstances. Dr. Brown said that in a recent English case a lord justice had remarked that the medical practitioner "must get such consolation as he could out of the fact that trial by jury was the foundation of his liberty"; damages amounting to £2,000 plus costs were given against the medical practitioner, who had shown the most elaborate care of the patient. The jury did not want to find him negligent, but wanted to compensate the child. When the judge explained that they could not do this without finding the medical man negligent they brought in the adverse verdict.

With reference to consent to operation, Dr. Brown said that it was an assault to perform a surgical operation on a person without his consent or the consent of a person entitled to give it on behalf of the patient. Where a

person was unconscious, and no relative or other person entitled to consent was available, and the operation was necessary to save life and was performed with due skill and care, and no more was done than necessary, the surgeon would not be liable. The same rule applied to examination of a patient against his will or without consent's being given on his behalf.

With special reference to operations involving removal of the uterus or both ovaries, cosmetic operations and orthopedic operations, Dr. Brown considered that the surgeon should obtain written consent or consent capable of proof, preferably by two witnesses, for the proposed operation, and should explain carefully the need of operation and its risks and results to the patient. Written consent was much to be preferred to oral, on account of its permanence, even though the oral consent was capable of proof.

The experience of the Medical Defence Association had abundantly proved that the most scrupulous care and the greatest skill would not exempt the medical practitioner from the risks to which he was exposed in the conscientious pursuit of his calling; yet many members of the profession in Victoria, who were ordinarily intelligent men, had failed to become members of the Medical Defence Association.

Dr. Brown compared the value of membership as an investment with that of the mutual insurance societies. Losing an action for negligence did not mean only the loss of the money at the time; but monetary loss might continue for years, in addition to the long-drawn-out mental worry and annoyance. Even if the case was won the amount of costs collected, if any, would not cover the loss of practice, the worry, the ill will or the out-of-pocket expenses for *locum tenens* and professional legal expenses. The expense rate, including income tax payments of the Medical Defence Association, was approximately 13.9% of premiums.

Dr. Brown considered that if at a consultation a medical specialist advised a line of treatment with which the other practitioner was not familiar, it was better that the specialist should institute the treatment or demonstrate it to his colleague. This course should be followed especially if there was any risk or uncertainty as to the result, or the treatment was one that had been introduced recently and was not in common use.

Dr. Brown enunciated three corollaries to the use of X rays, radium, diathermy and similar forms of special treatment. The law would presume that the medical practitioner applied reasonable knowledge and skill; the patient would presume that he knew what he was doing and would not risk injury without due discussion of the risks. If the medical practitioner used such methods without proper knowledge it was not fair that his colleagues should accept the whole burden if he displayed culpable ignorance or neglect.

Dr. Brown concluded by a number of references to circumstances in his experience that had brought medical practitioners face to face with medico-legal difficulties.

Dr. HUGH MITCHELL expressed appreciation of the importance of the subject and the manner in which it had been introduced for discussion by Dr. Murray Morton and Dr. R. C. Brown. He suggested that more medical practitioners would join the Medical Defence Association if they were presented with a clear statement of what they could expect to get in the way of cover for the annual premium. Several of his friends had failed to join because they had formed the impression that they would not get a complete insurance against the legal risks of medical practice.

Dr. A. J. TRINCA offered a tribute of thanks to the opening speakers and gave several instances of the infinite trouble taken by the executive of the Medical Defence Association to protect and defend the members. People inexperienced in radiography were inclined to regard the X ray tube as a lens, whereas in a skiagram, on account of distortion, the condition always looked worse than was actually the case.

Dr. W. L. CARRINGTON expressed a warning that medical practitioners should protect themselves to the uttermost by refraining from undue optimism and by taking the

trouble to mention to their patients the possibly unfavourable outcome of certain procedures before adopting such forms of treatment.

Dr. J. BUCHANAN stressed the importance of the subject under discussion and discussed the medico-legal dangers and legal status of sterilisation operations and the medico-legal implications of the possible misuse of the term "gonorrhoea".

Dr. A. E. COATES expressed agreement with Dr. Carrington in his advocacy of the policy of giving a guarded prognosis. In practically every operation there was some risk of misadventure, and the patient should be warned. In case of difficulty or doubt medical practitioners should ask for a consultation. In his work as a surgical referee he had formed the impression that absence of consultation was conspicuous in cases requiring review. The possible eventuality of medico-legal difficulties was a very sound reason for consultation. If dissatisfaction arose it was much better that consultation should have been arranged before rather than after legal action was threatened. As individuals medical men were parts of the body social and did not have some of the legal rights that they were apt to presume they had. By attending the meetings of the Medico-Legal Society medical practitioners could obtain valuable information on important medico-legal questions. The law was in a state of flux and members of the legal profession were willing to expound it with illustrations of precedents. It was important that it should be remembered that problems without precedent had also to be faced at times in the law courts.

Dr. W. W. OSTERMEYER referred to the legal risks of the medical calling as enormous in comparison with those of most other occupations. He considered that medical students should receive specific instruction on medico-legal aspects of practice. He thought that as patients came for treatment medical practitioners should avoid diagnosis as far as possible in conversation with the patients, or qualify their comments and choose the form in which they conveyed the information with due care and prudence. They should also avoid adverse comments on treatment by *confrères*, remembering that they could not know the full circumstances.

Dr. F. L. DAVIES mentioned the big element of blackmail as a motive in threatened litigation, and illustrated his remarks with several examples. He invited Dr. Dickson to reply to the discussion.

Dr. Dickson, on behalf of Dr. Murray Morton, expressed pleasure at the way in which the paper had been received and discussed.

A MEETING of the South Australian Branch of the British Medical Association was held at the Adelaide Hospital on July 23, 1938, Dr. P. T. S. CHERRY, the President, in the chair. The meeting took the form of a number of clinical demonstrations by members of the honorary staff.

Hysterical Paralysis.

Dr. THOMAS GRANT showed a woman, aged fifty-eight years, who had been "paralysed" for eight years. The illness had had a sudden onset following the death of her husband. For over seven years she had sat in an invalid chair.

On examination she exhibited purposeless, bizarre movements not unlike those seen in Huntington's chorea. The movements ceased when she was not under observation. Her gait was peculiar, attempts to walk being accompanied by much shuffling and side-stepping and kicking. There were no neurological signs of organic disease. The condition was hysterical, and the patient had improved somewhat under treatment during the past year.

Post-Encephalitic Parkinsonism.

Dr. Grant's second patient was a single woman, aged forty-five years, who twenty years previously had had an attack of encephalitis. This was followed in some months

by stiffness of the arms, which gradually spread to involve all extremities. At the time of the meeting she exhibited the typical picture of post-encephalitic Parkinsonism, with rigidity, tremors and mask-like expression. For the past two years she had suffered from oculogyric crises, which occurred about twice a week and lasted twenty-four hours. Bensedrine had been administered in an attempt to control these, but it was of no avail. The patient took 210 drops of tincture of stramonium each day. This had been very beneficial in lessening the rigidity and the salivation.

Epithelial Odontoma.

Dr. ALAN LONDON's first patient was a labourer, aged forty-three years. He had first been seen on October 21, 1937, two days after having knocked his jaw on an iron gate. He stated that he had had a fractured jaw twenty years before, sustained during dental extractions, and his jaw had been asymmetrical since then.

Examination revealed a tumour of the left side of the mandible, which appeared to have caused expansion of the whole bone on that side. An X ray examination, made on October 22, 1937, revealed a multilocular cystic condition of the left mandible, throughout almost its whole extent, with the exception of the head and neck of the bone and the coronoid process. It did not appear to be malignant. No retained tooth roots were apparent. Another X ray examination was made on June 22, 1938. This suggested that the tumour was most likely to be a cystic adamantinoma. There appeared to be traces of irregular dental tissue.

During the nine months up to July, 1938, very little change appeared to have taken place. The man stated that the dentures had not fitted properly since he sustained the knock in October, 1937.

Gastric Carcinoma.

Dr. Lendon's second patient was a man, aged seventy-seven years, who was admitted to the Adelaide Hospital on August 16, 1935, complaining of a cough of a week's duration, loss of weight and general pruritus. Examination revealed evidence of bronchitis and anaemia. Examination by means of a test meal, on September 2, 1935, revealed no free hydrochloric acid. Blood was present in all specimens.

A barium meal was given on September 10, 1935, and an X ray examination was made. This revealed a filling defect of the body of the stomach in the region of the greater curvature, due to a newgrowth. This was thought to be a localized proliferative type of carcinoma. The stomach emptied sluggishly, possibly on account of reflex pylorospasm.

On September 25, 1935, an operation was performed. Under intratracheal ether anaesthesia, after a transfusion of blood had been given, the abdomen was opened by a supraumbilical incision in the middle line. Partial gastrectomy was performed. The jejunum was brought through the transverse mesocolon and united to the cut end of the stomach. Examination of a section showed it to be carcinoma, but no metastatic deposits were found in the glands.

Convalescence was uneventful, except for a wound infection, which resulted in a ventral hernia. At the time of the meeting the patient still had bronchitis and pruritus, but no sign of a recurrence of the tumour.

Acute Infective Arthritis.

Dr. JOHN MAYO's first patient was a boy, aged nearly eight years, suffering from acute infective arthritis of the right hip. The onset was abrupt, with elevation of temperature and rigors. The joint was drained and creamy pus was evacuated. The infecting organism was found to be *Staphylococcus aureus*.

After this procedure the patient was placed in plaster of Paris for sixteen months, and at the time of the meeting he was just beginning to walk without crutches. Examination showed that he had full movement of the hip in all directions, except flexion. This was limited to 90°.

Subacute Arthritis.

Dr. Mayo's second patient was a boy, aged nine years, suffering from subacute arthritis of the left hip. This boy gave a history of acute mastoiditis treated surgically two years earlier. The infecting organism was a streptococcus. A year later he had been hit on the left hip with a cricket ball, and subsequently began to limp. For three months before admission to the Children's Hospital he had been in a country hospital with a diagnosis of "erosion of the head of the femur".

When first seen at the Children's Hospital he had subluxation of the left hip, with adduction and internal rotation of the limb. The Mantoux test elicited a strongly positive reaction. The subluxation was reduced by extension, and the child was placed on an abduction frame preparatory to the limb's being placed in plaster of Paris. The radiologists and orthopedic surgeons present concurred in regarding the condition as probably streptococcal in origin and not tuberculous.

Nævus.

Dr. Mayo's third patient was a baby girl, who had had a nævus on the forehead. This had been treated with small doses of highly filtered radium. The scar was almost invisible.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Blumer, George Alfred, M.B., M.S., 1910 (Univ. Sydney), D.P.H., 1924 (Univ. Melbourne), Customs House, Newcastle.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Barling, Eric Vernon, M.B., B.S., 1936 (Univ. Sydney), 287, Stanmore Road, Stanmore.

Bora, John Kaspar, M.B., B.S., 1937 (Univ. Sydney), 5, Springdale Road, Killara.

Carrodus, Arthur Leary, M.B., B.S., 1935 (Univ. Sydney), 2, March Street, Bellevue Hill.

Diamond, Bertram Herahall, M.B., B.S., 1935 (Univ. Sydney), 24, Marlborough Hall, Roslyn Street, Elizabeth Bay.

Lee, Milton Raymond, M.B., B.S., 1938 (Univ. Sydney), 17, Gardyne Street, Bronte.

Marsh, William Brien, M.B., B.S., 1938 (Univ. Sydney), 9, Wallaroy Road, Double Bay.

Smith, Irwin Lionel, M.B., 1933 (Univ. Sydney), 8, Boronia Avenue, Croydon.

Whiting, Terence Keith Smyth, M.B., B.S., 1938 (Univ. Sydney), Marsden Street, Parramatta.

THE undermentioned has been elected a member of the South Australian Branch of the British Medical Association:

Brummitt, Donald William, M.B., B.S., 1938 (Univ. Adelaide), Adelaide Hospital, Adelaide.

Post-Graduate Work.**A COURSE IN OBSTETRICS AT SYDNEY.**

THE New South Wales Post-Graduate Committee in Medicine announces that a course in obstetrics will be held at the Royal Hospital for Women and the Women's Hospital, Sydney, from the afternoon of January 7, 1939, to the afternoon of January 14, 1939. Residence will be provided at the hospitals.

The course will be arranged to meet the needs of graduates of one or more years' standing. It will be under the direction of a supervisor, and daily demonstrations and short talks on recent advances in obstetrics will be given.

The fee for the course will be five guineas, and this will be inclusive of board and residence. If applicants indicate the hospital at which they wish to reside, their wishes will be complied with if possible.

Application for registration should be made as soon as possible to the Secretary, New South Wales Post-Graduate Committee in Medicine, the University of Sydney, Sydney. The list will be closed as soon as 17 registrations are received.

Obituary.**CARL VIVIAN STEPHENS.**

CARL VIVIAN STEPHENS, who died at Melbourne on August 22, 1938, was widely known and well loved. His passing will be mourned by all who came in contact with him. The sympathy of the profession is extended to his wife and family.

We are indebted to Dr. H. Boyd Graham for the following account of his career:

The death of Carl Vivian Stephens on August 22 has severed for many people a treasured friendship.

Carl Stephens was born on January 27, 1886, at Hawthorn, Victoria. He was the second son of the late J. C. Stephens, Esquire, master printer and journalist. He received his primary education at the Camberwell State school and won a government scholarship, which he held at Wesley College. His scholastic work at Wesley College was of a consistently high order and of a quality which, at the conclusion of his school-days, enabled him to win a government exhibition, with the assistance of which he proceeded to the University of Melbourne.

At Wesley College, Carl Stephens was also prominent as a sportsman. In 1901 he was awarded the cadet medal and won a medal for rifle shooting and the championship at athletics under the age of sixteen years. In the following year he won three races at the athletic sports and also the mile event in the schools' championship of Victoria. In 1903 he was successful in adding the old boys' cup to his trophies.

He commenced the medical course at the University of Melbourne in 1903 and graduated in December, 1907. At the final honours examination in March, 1908, he gained first-class honours and the exhibition in pathology and bacteriology, second-class honours in medicine and obstetrics, and second-class honours in surgery and gynaecology. This splendid achievement won for him second place in the final honours list.

He spent 1908 and 1909 as resident medical officer and registrar at the Melbourne Hospital, and after a few months in residence at the Geelong Hospital in 1910, commenced practice in North Melbourne. He obtained the degree of Doctor of Medicine in 1910; but to his lasting regret became so involved in a very busy general practice that he did not get the opportunity to obtain a higher surgical degree. He combined much major surgery with the general work, and was elected a Fellow of the Royal Australasian College of Surgeons shortly after the foundation of the college. He remained in practice at North Melbourne until his health broke down in 1936. He earned a wonderful reputation as an exceptionally sound man, and in the earlier days at all events had a large midwifery practice. After his illness in 1936 he relinquished the general work and continued at Number 2, Collins Street, only. Although his days and nights were so fully occupied, Carl Stephens served the Melbourne Hospital for twenty-five years as an assistant in the surgical clinics of Victor Hurley and, later, of W. A. Hailes.

Stephens was a "rare compound of oddity, frolic and fun"; "like the sun he cheered all human kind"; he was a

great companion when on pleasure bent, and always had something cheery to say to his friends and to the patients, practically all of whom could claim his friendship. His counsel was wholesome and he has left many behind him who will have to turn elsewhere for the advice and encouragement they have been accustomed to seek from him. He was a highly expert fly fisherman and was a close friend of the late Mr. Blackwood, classical tutor at Trinity College, whose book "The Quest of the Trout" is well known to all interested in fly fishing. He was an enthusiastic stamp collector and acquired a fine collection. On account of physical disability following severe typhoid fever in 1913 he was not accepted for war service; but during the war years was acting surgeon to out-patients at the Melbourne Hospital.

He enjoyed a regular game of tennis until he was advised to relinquish playing games after his serious illness in 1936. He was a Freemason, a keen Rotarian and a member of the Athenæum and University Clubs. He was fond of billiards and a frequent winner of tournaments.

Carl Stephens was an ideal husband and father, and was extremely happy in his home life. He was the fortunate possessor of an equable temperament, which helped to make him beloved of all who formed the very wide circle of his friends and acquaintances; the *equanimitas* of Osler developed to a high degree.

Dr. Robert Southby writes:

With the passing of Carl Stephens the community has lost one of its best members; a widespread group of patients have been deprived of not only their doctor, but their guide, philosopher and friend; the profession has been robbed of one of its most versatile, staunch and beloved colleagues, and his family is bereft of one whose place can never be filled.

Having been privileged to work with him constantly for over twelve years, and to have lived in his home for an appreciable period, one finds it impossible to imagine the extent of the break which can never be restored, and which leaves one with the acute sense of having become a medical orphan.

As a teacher he always took a sympathetic interest in all who came to learn, and I still cherish many a valuable practical hint gained from early tutorial classes at the Melbourne Hospital. As a practitioner, few, if any, have been gifted as he with his knowledge of general medicine, his skill and judgement as a surgeon, and his ability as an accoucheur; and few have been granted the esteem with which he was regarded as a consultant.

As a colleague he imbued one with the incentive to try to follow the high ideals which he practised in all his work. His first thought was always what would be in the best interests of the patient who had gladly placed his life in the hands of the physician he loved. At the same time he always maintained that devout sense of loyalty to all his *confrères*, amongst whom he was affectionately regarded as a "white man".

The heart-felt expressions of grief from countless numbers of his old patients give true indication of the personal loss which they have all sustained.

At the beautifully simple service at his home one could not but be overwhelmed at the number of strong men

friends who gave vent to their emotions in an unconcealable flood of tears upon the realization of the utter loss of one whom they so dearly loved.

We have lost Carl in the person, but his spirit will continue to move for generations, reflecting a life of self-sacrifice for his fellows, shortened through that same disregard of self.

"Greater love hath no man than this, that a man lay down his life for his friends."

Never was a truer word recorded than of our late lamented friend Carl Vivian Stephens.

And to the last second he maintained that spirit of Rotary of which he was such an ardent supporter: "Service before Self."

Dr. Reginald Webster writes:

To contribute an appreciation of the late Carl Stephens is one of the saddest tasks which I have ever essayed, and yet a privilege that I would not willingly forgo; for I owe him

so much. During the whole of my professional life I have been indebted to him for countless kindnesses, the greatest of which was the intimate and enduring friendship with which he honoured me. To this friendship, now for me a hallowed memory, he gave expression in a never-failing interest in all my activities.

For many years it has been Carl to whom I have taken my worries and anxieties, confided my hopes and fears; and I have been only one of many for whom he exercised his wonderful faculty for making "the crooked straight, and the rough places plain".

I shall never forget the startling impression which, as a junior boy at Wesley College, I received when a competitor for the old boys' cup at the annual sports meeting of the college, took the field in a running singlet emblazoned with a skull and cross-bones. The wearer of the alarming emblem, later to become very familiar as that of the Medical Students' Society, and the winner of



the old boys' cup, was Carl Stephens, whom as yet I did not know. Little did I dream that I was to enjoy with him a friendship of twenty-five years, a close association, unassailed by any rift or hint of discord, and a dispensation of Providence for which I feel the deepest gratitude.

Until his activities were seriously curtailed about two years ago, scarcely a week passed without Carl Stephens looking in at my laboratory four or five times, always with the tonic effect of a breath of fresh air. He was the personification of good fellowship and effervescent merriment; always "rude" to me. Had he been "polite" I should have wondered in what manner I had offended him.

Of his work no doubt others will write, and there will be unanimity of opinion regarding his essential soundness. In spite of the many demands and tiring exigencies of a busy general practice he maintained himself well abreast of advances in medicine and surgery, and was an extremely competent surgeon, accomplished in operative technique and possessed of sound surgical judgement.

I was admitted into his family circle to the extent that in my early days in the profession his home was my home. Many times have I eaten at his board and slept under his roof. It was one of life's enriching experiences to observe the perfect harmony which prevailed in his home and feel the atmosphere of concord and affection inspired by the lovable central figure.

The keynote to Carl Stephens's character is given in one word—generosity. Generous in the hospitality which, with his devoted wife, he loved to dispense in their country home at Healesville; generous in many acts of material assistance to friends and patients alike; generous in the kindly and practical interest he took in all about him, notably the nurses who worked under his direction and were without exception devoted to him; above all, generous in his judgements of the actions and motives of his fellows—such was the man that was Carl Stephens.

Memories crowding upon me as I write render the theme too poignant to pursue. Vale!

Dr. William Allan Hailes writes:

A host of friends and well-wishers heard with extreme regret of the passing of Carl Stephens. To those of us who were his close friends and associates the attributes which endeared him to all were so apparent that it seems unnecessary to enumerate or even refer to them. The association of most of his friends in the medical profession was formed and centred around his connexion with the Royal Melbourne Hospital. A successful academic record at the university was followed by appointments for two years on the resident staff of that hospital before he engaged in private practice. Although surgically minded, he had not a senior surgical degree when he entered private practice; and a regulation framed subsequently debarred him from consideration for future appointment to the surgical staff.

Carl Stephens was an acting out-patient surgeon for some considerable period; but the outstanding factor in his hospital record was that, except for that period, he was a surgical clinical assistant from the day he entered private practice till the commencement of that illness which all who knew him so regretted and silently feared. And what an assistant! For nine years I knew that it was difficult to be there before him and that he was never away unless on holidays; two half-days a week were given to the hospital over all those years, despite the fact that he had one of the largest practices in Melbourne. And why? Because he loved the "Melbourne"; he valued the good fellowship, to which he so largely contributed, of those doing the work, and he wanted to be associated with it. It was his tribute to his old medical school and the work that it was doing. He told me that he regretted sincerely his resignation, but he realized it had to be. However long or arduous the day might be, I never saw him angry or discontented; he had time to listen to the woes of others without irritation or impatience, help them in their troubles, and yet do more than his share of the work.

A good clinician, sound, practical, backed by an extensive experience, his opinion was invaluable and his interest

in the teaching such, and his obvious desire that the clinic should be a good one and the students get a "good run" so pronounced, that no one could be slack.

But with all these attributes it was his nature that attracted most. He radiated good fellowship and humour. A good mixer, without in any way seeking to be such, he had time to listen patiently to all, whatever their station or situation, and surely that is real quality.

Though running and tennis had claimed him, in the field of sport it will be as a fly fisherman that he will be specially remembered. He was a master fisherman in technique and rivercraft, a splendid instructor, pains-taking, humorous and with a wit that never hurt. Many members of the medical profession are numbered amongst his pupils, and all will acclaim not only his skill, but his unselfishness, almost amounting to self-effacement; unless you watched very closely you would find that you would always be fishing where the fish was most likely to be.

It gave him more pleasure to see his pupil or companion successful than for him to be so. Could anyone desire a more delightful companion? Although I did not know it in its heyday, when fish were plentiful and large, my happiest memories of him will always be of holidays spent in the beautiful Klewa Valley, to which he was so attracted; a pioneer there amongst the fishermen, he knew every foot of it; he knew the people and he loved it all.

Two severe illnesses in his early years, combined with the wear of a strenuous life, suddenly found a weak link in a physique that seemed fit for years of service. And of those last two years, with such a shadow over him, he continued on his course, never speaking of his illness nor showing any indication that anything was amiss; several who did not know him closely have told me how they admired that stiff upper lip, the courage and resolution of the man.

Dr. Edwin Cato writes:

With the passing of Carl Stephens, Melbourne has lost one of its soundest practitioners of the art of medicine. A rarity in this age of specialists, he was an accomplished surgeon as well as a physician. For many years he had one of the largest of our suburban practices, and it was my good fortune to spend a very happy twelve months as his assistant. His balanced judgement and clinical acumen were apparent to anyone associated with him.

He had a cheery nature, keen sense of humour, and unruffled temper, and these carried him through the longest days; and his ever-widening circle of patients were probably unaware of the physical stress under which he often worked.

On his rare holidays he was usually to be found on some quiet trout stream, and he was, of course, one of the pioneers of dry fly fishing in Victoria. He died, literally in harness, doing the work he loved so well; and I am sure this would have been his own wish.

He was friend as well as "doctor" to his patients, and his death leaves a gap indeed difficult to bridge.

JAMES PARK.

We regret to announce the death of Dr. James Park, which occurred on November 8, 1938, at Tatura, Victoria.

Correspondence.

SOME ASPECTS OF THE PATHOLOGY OF BONE TUMOURS OF INTEREST TO RADIOLOGISTS.

SIR: When I was a student we were taught that it was possible to map out the lateral borders of the heart by percussion. Personally I was never able to convince

myself that this was so; but in the presence of triumphant assertion by my contemporaries, I always maintained a cowardly silence, being oppressed by the feeling that they possibly possessed something which I lacked. More recent years, however, have convinced me that my only lack was a vivid imagination; for even the physicians now admit the inaccuracy of the method. Thus one inferiority complex has been laid to rest.

But I have also long possessed another one of similar kind. Until I read Dr. Willis's recent article in your journal on the pathology of bone tumours I had a teasing feeling of ignorance and uncertainty in regard to the interpretation of X ray films depicting bone tumours or possible bone tumours. I have long seen my betters, both at home and abroad, take a film and from mere inspection pronounce the nature of the lesion to be Ewing's sarcoma, metastatic carcinoma or osteogenic sarcoma, with a calm certainty, the basis of which has always eluded my understanding. Nor has a fairly extensive perusal of the literature furnished any solace; for here are found only contradiction and confusion, with critical diagnosis often perched precariously on the sharp edge of a single objective feature of the film. To the radiological mind onion layering of the periosteum signifies Ewing's tumour, or radiating spicules suggest osteogenic sarcoma. Such generalizations are an over-simplification of a difficult pathological problem; for Dr. Willis has now shown beyond dispute that these anatomical processes are common to differing bone lesions, just as redness, swelling and heat are common to differing varieties of inflammation.

In any case, when the precision behind the microscope finds it difficult to classify these tumours, it is beyond reason to expect qualitative accuracy from the macroscopic data gained by X ray examination. You cannot measure thousandths of an inch with a foot-rule, and you cannot make histological diagnoses by radiological methods. I have long suspected that accepted radiological teaching in regard to bone tumours attempts an order of accuracy beyond its powers, and Dr. Willis has now restored my self-respect by exposing the fallacy of the current radiological dogmas.

Certain practical conclusions follow if we accept this research. The surgeon must not cast all the responsibility on the radiologist where such radical treatment as amputation hangs on the diagnosis. The frequency of a concealed primary growth whose metastasis simulates the initial and only lesion, stresses the necessity for complete examination and especially complete radiological examination of the skeleton and lungs. Lastly, radiologists and physicians alike must realize that it is not the function of the radiologist to give a final and decisive opinion from the film alone, but rather to contribute his quota of knowledge to the combined consultation wherein the diagnosis is made. The finding of malignancy or non-malignancy has some basis in the presence or absence of bone destruction and its resulting pattern, but the further refinements of classification depend largely upon other elements of the investigation. Dr. Willis's treatment of the subject clearly demonstrates how radiological interpretation must be based on sound pathological concepts if it is to be of any real value.

Yours, etc.,

ERIC W. FRECKER.

137, Macquarie Street,
Sydney,

October 4, 1938.

MEDICO-LEGAL RISKS IN MEDICAL PRACTICE.

Sir: The attention of the Committee of Counsel has been called to the publication in your journal of September 17, 1938, of an address by the President of the Medical Defence Association of Victoria, entitled "Medico-Legal Risks in Medical Practice", which was read at a meeting of the Victorian Branch of the British Medical Association on June 1, 1938.

In the course of the address this passage occurs:

Through the medium of the Medico-Legal Society we were afforded an opportunity in 1936 of bringing before some influential members of the legal profession the hardships of the medical profession under the present legal procedure. Subsequently the judges of the Supreme Court of Victoria drafted a new set of rules of procedure, which provided for such actions as those against medical men for bodily damage to be tried by a judge without a jury, unless the plaintiff could show good cause for a hearing before a jury. After the observance of certain prescribed formalities these rules were actually gasseted, and normally would have become operative on April 1, 1938. The new procedure would have suited us admirably, inasmuch as we should have been delivered from the routine of jury trials in medical cases. Unfortunately, owing to a vigorous protest from the Bar Committee, no doubt composed in part of die-hard jury-counsel, the Government intervened; and by an Order-in-Council the operation of the new rules has been suspended until consideration by Parliament at its next session. There is serious danger that the outside influences which prevailed on the Government to obtain the suspension will also cause Parliament to veto the new rules altogether. Consequently medical defendants will still be left to the tender mercies of ignorant and prejudiced juries; and more or less unscrupulous legal practitioners will continue to promote actions for damages for large amounts (the fashionable one is £5,000), relying on the knowledge that once a case of this kind reaches a jury it is already half won by the aggrieved patient.

Whether intended or not, this passage contains a most unjustified reflection upon this committee, and we think it proper to put before your readers certain facts about the matter therein discussed.

It is true that in 1936 representations were made to certain members of the legal profession that the rules of the Supreme Court relating to trial by jury should be amended to deal with the special case of actions brought by patients against medical practitioners for alleged unskilful or negligent treatment. The suggested amendment, though of a very limited character, contained features which did not commend themselves to this committee. The suggestion that the new rules of procedure drafted by the judges of the Supreme Court arose from these representations is quite unfounded.

The new rules of procedure, so far as they related to trial by jury, were much wider in operation. The effect of the new rules was to deprive the subject of his existing right to trial by jury in all cases except libel, slander, false imprisonment, malicious prosecution, seduction, and breach of promise of marriage. In all other cases trial was to be had before a judge without a jury unless a judge otherwise ordered.

The Bar of Victoria (not the Bar Committee) met to consider this vital limitation on the right of the subject. The meeting was very well attended, and some seventy counsel on the roll passed the following resolution unanimously:

That the Bar of Victoria disapproves of the provisions of Order 36 of the Amended Rules of the Supreme Court 1937 insofar as they restrict the right of parties to trial by jury in civil cases as provided by the Rules of the Supreme Court 1916 and that the Committee of Counsel be instructed to convey this resolution to the Attorney General of the State of Victoria.

If the point sought to be made by the address is that this was brought about by a few die-hard jury counsel, it is quite wrong and unfair to the body of counsel who acted in what they considered to be the public interest in a matter of grave importance where the liberty of the subject was concerned. The fact that the "new procedure would have suited" the medical profession "admirably" could not be allowed to prevail against the general public good and to lead to an abrogation of rights which are

considered by many judges and eminent jurists to be of fundamental importance to the subject.

It would be interesting to know what is meant by the assertion that "outside influences prevailed on the Government to obtain the suspension" of the new rules. My committee does not flatter itself that it has such power, though it hopes and thinks it proper that due weight was given by the Government to the unanimous resolution passed after careful consideration of the matters which appeared to the Bar to be in the public and not a sectional interest.

It is interesting to note that the motion for the disallowance of the rules was proposed in the Legislative Assembly by a layman and was carried unanimously.

The reference to "more or less unscrupulous legal practitioners" calls for this comment: it creates a danger of your readers' concluding that all or most cases against medical practitioners are promoted by lawyers who have not a proper regard for the ethics of their profession. This is without foundation, as is the suggestion that the jurors who try actions of this sort are both ignorant and prejudiced.

We would remind your readers that under the existing rules a judge has a discretion to withdraw from a jury any case which requires a scientific investigation which in his opinion cannot conveniently be made with a jury. This rule has been interpreted in such a way that an action against a medical practitioner can be withdrawn from a jury if a judge is of the opinion that it involves a scientific investigation which is such as is likely not to be properly or adequately understood or appreciated by "ignorant" jurymen. The dissatisfaction of some medical men with this rule may be due to the fact that experienced judges are not so ready to assume that the average jurymen is as ignorant as your publication suggests.

Yours, etc.,

J. G. NORRIS,
Acting Honorary Secretary,
Committee of Counsel.

Selborne Chambers,
Chancery Lane,
Melbourne, C.I.
November 3, 1938.

EUROPEAN CONSULTANTS.

SIR: Certain people with foreign-sounding names have set up in practice at King's Cross, Darlinghurst, Sydney, styling themselves "European consultants". It is obvious who and what these people are. What are we as a profession going to do about it? Before long the country will be flooded with them, and then no doubt we will register them, and then the Government will be able to defeat us with national insurance.

Yours, etc.,

279, Maroubra Bay Road,
Maroubra,
New South Wales.
November 2, 1938.

L. LABRELESTIER.

A CONSIDERATION OF GENERAL ANÆSTHESIA FOR DENTAL SURGERY.

SIR: I wish to express my appreciation of the letter from Dr. Douglas Renton in THE MEDICAL JOURNAL OF AUSTRALIA, October 29, in response to the above-mentioned article.

I am in complete agreement with Dr. Renton's remarks regarding general anaesthesia for dental surgery. The two really safe methods, having in mind the chance of inhalation of blood and mouth contents during operation, and the risk of subsequent lung infection, are: (i) nasal administration of nitrous oxide and oxygen under pressure for minor dental operations, and (ii) endotracheal inhalation anaesthesia with a wide-bore catheter and the long gauze scarf pack, for major dental operations. The difficulty, however, lies in finding medical practitioners who are suf-

ficiently interested to provide the necessary apparatus, or if this has been supplied by the dentist, have mastered the technique of anaesthesia suitable for these cases. Quite often the dental surgeon is forced to use "smash and grab" methods rather than run the risk of reintroduction of anaesthesia, with its attendant risks.

I agree with Dr. Renton that in a dental operation the dentist is the surgeon in charge of the patient, and it is his right to demand certain standards of anaesthesia for his work. In the capital cities specialist anaesthetists are available if the patient's usual medical attendant cannot supply the required service. In the country, specialist's services are not available.

With regard to post-operative pulmonary sequelae, I have statistics compiled from various sources, which go to show that these sequelae are much more frequent in Victoria than is generally accepted. These have been embodied in a thesis recently presented, and will, I hope, be published in the near future.

Yours, etc.,

NOEL E. E. HEATH, D.D.Sc. (Melb.).

T. & G. Building,
Geelong,
Victoria.

November 7, 1938.

THE PRESENT POSITION OF SURGERY OF THE THYROID.

SIR: I appreciate Mr. W. Maxwell's compliment in discussing my article on surgery of the thyroid in his letter published in THE MEDICAL JOURNAL OF AUSTRALIA, November 5, 1938, as even though he restricts his remarks to one detail of the operative technique, it is actually the crux of the question in dealing with all cases of thyrotoxicosis. I pay no attention to whether I remove four-fifths or nineteen-twentieths of the total thyroid tissue present, the main principle being to leave as small a portion of gland tissue as is practicable, the actual amount varying according to the condition of the gland and the probable needs of the patient. On the average I leave only a portion of the left lobe about the size of a large almond, namely 3.0 by 1.0 by 1.0 centimetre; but with the small atrophic glands it is less than this, and in certain cases, for example, those with persistent auricular fibrillation, I remove the whole of the thyroid gland tissue.

After complete removal of the right lobe, isthmus and pyramidal lobe (if present) I ligate and divide the superior thyroid vessels of the left side so that the whole of the left lobe may be lifted up into the wound and one can see exactly how little of the gland may be left. My reasons for doing this are as follows:

(1) In many cases there is a large retrolaryngeal process of the gland, and its size cannot be estimated until the upper pole is freed and the gland lifted. This is frequently present on both sides and any wedge resection fails to take it into account.

(2) In many cases, especially in the male, the thyroid lies very deeply in the neck and before operation may not be recognized clinically as an enlarged gland. Its full size should not be guessed at and cannot be appreciated unless it is completely visualized as I recommend.

(3) It is surprisingly common to find an intrathoracic projection from the lower lobe of the gland, especially on the left side, a condition I have found apparently overlooked by the previous operator when I had to carry out a second operation. In two cases recently I removed intrathoracic growths in patients who had been twice operated on.

(4) When wedge resection has been performed it makes a second operation one of great difficulty and it is often impossible to remove as much of the remaining gland tissue as one would wish in order to secure a clinical result satisfactory to both patient and surgeon.

I am in full agreement with Mr. Maxwell's remarks as to the avoidance of injury to the inferior laryngeal nerves and the parathyroids by working inside the true fascial capsule of the gland, which is best entered by an

incision along the anterior border of the sterno-thyroid muscle.

A cursory review of the embryology of these structures shows they lie in different morphological planes to the thyroid gland and outside the proper fascial covering of this gland, so that by a strictly anatomical removal of the thyroid they should not be damaged other than by traction, and any dysfunction produced in this way clears before the usual three weeks' period of hospitalization is completed.

I regret I cannot agree with Mr. Maxwell in his contention that leaving only the posterior borders of the lobes intact is the technique of choice, and must repeat that this method as well as the more commonly practised wedge resection does not give as satisfactory results as the technique I advise if one follows up a series of even one hundred cases.

Yours, etc.,

225, Macquarie Street,
Sydney,
November 8, 1938.

HUGH R. G. POATE.

THE MEDICAL PRACTITIONERS BILL OF NEW SOUTH WALES.

SIR: It is manifest that the freemasonry of medicine does not cater for medical undergraduates. It is unfair that students should be abandoned by the profession, when such vital issues, medical and political, have been raised, in the Medical Practitioners Bill, which aims (among other things) to enforce residency on graduation before full registration is granted.

Admittedly the students have shown some competence in dealing with this problem. The Medical Society's deputation to the Minister for Health and letters to the lay Press indicate activity in response to noxious stimuli. The student hand should be strengthened by reinforcement from the ranks of the senior men of the profession. The Faculty of Medicine too could do a lot.

If 100 men and women graduate in December, their allocation to hospital should be a matter for the university, not for the governmental departments, still less for hospital boards. Caprices and whimsies must not enter into such an important decision. There must be some guarantee that residents will obtain reasonably uniform opportunities to practise medicine and surgery; that they will be given decent housing, good food and comfortable recreation quarters. The question of adequate salary obviously is not a matter for a hospital board, which in this and the above respects has shown no capacity to satisfy reasonable demands.

It is not too late for the profession to exercise its best influence on these crucial points; the matter calls, not for fits and starts, but for persistent action from those to whom the undergraduate is entitled to turn.

Yours, etc.,

The University,
Sydney,

November 14, 1938.

ISADORE BRODSKY.

ASPIRATION OF THE AMNIOTIC SAC FOR HYDRAMNIOS.

SIR: In regard to the article on "Aspiration of the Amniotic Sac in Hydranmios", I have practised the same technique from the same source, and in reference to six cases of which I have notes I would make the following comments.

My impression is that the method is extremely useful in certain cases where the fetus is of marked importance, though even then disappointment may ensue. Thus J.K., a primipara, very desirous of a child, was aspirated of thirty-five ounces; two weeks later the patient was again distressed but started in labour before reaspiration. A live female child, six pounds four ounces, was delivered with gross hare-lip and cleft palate.

Case I.L., aged forty years, third pregnancy, previously two full-time stillborn children with no demonstrable cause. At thirty weeks the patient had marked hydranmios, causing great distress. Aspiration of eighteen ounces gave relief. At thirty-three weeks forty-two ounces were aspirated with great improvement. Five days later distress was again relieved by aspiration of forty-one ounces. Labour commenced that night and terminated easily with a live baby, seven pounds, apparently normal. The child, however, would not take the breast, and had continual frothing of mucus at the mouth, especially so with attempts at feeding. Despite rectal feeding and intraperitoneal glucose, the child died on the fifteenth day. Post mortem examination disclosed congenital absence of the oesophagus—merely a length of fibrous tissue.

The maximum quantity to be aspirated is generally considered to be forty ounces. One case in which I aspirated sixty ounces was followed by immediate onset of labour. At one time the possibility of this procedure as a method of induction of labour was considered.

Puncture of the placenta is apparently unimportant. In one case the depth at which the sac was pierced would indicate passage through the placenta. There were no untoward sequelae.

Another difficulty is in the case of twins; thus in the case of A.F. I could aspirate fourteen ounces only, which gave little improvement to the mother, probably due to entry into the wrong sac.

Preliminary X ray is, of course, essential to reject anencephalus and spina bifida et cetera.

Yours, etc.,

W. J. RAWLING.

Canterbury,
Melbourne,

November 8, 1938.

NATIONAL HEALTH INSURANCE.

SIR: In almost every issue of THE MEDICAL JOURNAL OF AUSTRALIA during the past six months letters have appeared from members in every State of the Commonwealth, indicating the most reasoned and the most determined opposition not only to the terms and conditions of practice to be set out in regulations under the *National Health and Pensions Insurance Act, 1938*, but to the provisions of the Act itself. These letters, as time has elapsed, have seemed to me to disclose an increasing fear that, because members have had no information conveyed to them regularly and systematically by the Association, there is a risk of failure of united action when the time comes, as come it will very soon, to intimate publicly and officially the unwillingness of the members throughout Australia to accept service under the Act.

For the past five months the management of the profession's case has been in the hands of the Federal National Insurance Committee. During four of those five months the national insurance Royal Commission has been sitting. For political as well as legal reasons it has been impossible for the Federal Committee to deal in public with any of the questions relating to the members' attitude to the Act itself. But members may be assured that there has been no remission of effort or deliberation or planning on the part of members of that committee to give final effect to the implacable opposition of members of the profession to the whole of this ill-conceived piece of legislation.

While it is impossible to set out all that has passed in the last few weeks, members may be informed, as indeed they may have gathered from the Press, that the Government has shown an increasing awareness of the widespread opposition of the profession to the whole Act, and of the substantial and reasonable grounds for that opposition. If at length the Government were to leave the health insurance sections of the Act in abeyance and invite the members of the Association to conjoin with the friendly societies and other interested bodies in the conclusion of an Australian-wide agreement for an extended medical

service, it is the judgement of those who have held positions of responsibility in the matter throughout, that the profession would applaud the wisdom of the Government and offer its full cooperation.

In the meantime let the profession take note that in the last six months the full measure of its own strength throughout Australia has been gradually revealed. If in the past its policy has been drawn on a defeatist basis, it has but to realize its own strength, disclosed in this crisis, to ensure the continuation, through its leaders, of a more virile, fearless policy in favour of what it profoundly and honestly believes to be right in the interests of the standard of efficiency and high traditions of medicine in Australia.

My final word in this necessarily somewhat cryptic statement is to have faith in our own strength and unity, and the outcome will be sound.

Yours, etc.,

H. R. R. GRIEVE.

"Caberfeldh",
113, Homer Street,
Undercliffe.
November 14, 1938.

The Royal Australasian College of Surgeons.

MEETING OF THE BOARD OF CENSORS.

THE next meeting of the Australian Board of Censors of the Royal Australasian College of Surgeons will be held at the college, Spring Street, Melbourne, probably in March, 1939. Candidates who desire to present themselves at this meeting should apply to the Censor-in-Chief for permission to do so, on or before December 31, 1938. The appropriate forms are available at the college, Spring Street, Melbourne, and at the offices of the various State secretaries.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as duly qualified medical practitioners:

Dicks, Harold Griffiths, M.B., B.S., 1938 (Univ. Sydney), Cairns.

Grey, Basil Henry Louis, M.B., B.S., 1938 (Univ. Sydney), Toowoomba.

Last, Raymond Jack, M.B., B.S., 1924 (Univ. Adelaide), Brisbane.

Schafer, David Paul Hannaford, M.R.C.S. (England), L.R.C.P. (London), 1927, M.B., B.S., 1930 (Univ. Melbourne), M.R.C.P. (London), 1932.

VICTORIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act, 1923*, of Victoria, as duly qualified medical practitioners:

Jacks, Hermann, L.R.C.P. et S. (Edinburgh), L.R.F.P.S. (Glasgow), 1938.

Rochlin, Oscar, L.M.S.S.A. (London), 1938.

Apelschnitt, Oskar, M.D. (Bologna), 1938.

SOUTH AUSTRALIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act, 1919*, of South Australia, as duly qualified medical practitioners:

Rose-Innes, Arthur, M.R.C.S. (England), L.R.C.P. (London), 1917, Gladstone.

Mill, Jacob Davidson, M.B., Ch.B., 1920 (Edinburgh), F.R.C.S. (Edinburgh), 1937, M.R.C.P. (Edinburgh), 1938, Norwood.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act, 1912 and 1915*, of New South Wales, as duly qualified medical practitioners:

Salter, William Fulton, M.B., B.S., 1936 (Univ. Adelaide), Children's Hospital, Adelaide.

Reiter, Nicholas, L.R.C.P., L.R.C.S., 1936 (Edinburgh), L.R.F.P.S., 1936 (Glasgow), c.o. Mrs. Chauncy, Elizabeth Bay Road, Sydney.

Webb, Vernon George, M.B., B.S., 1916 (Univ. Melbourne), Walwa, Victoria.

Books Received.

ADVENTURES IN RESPIRATION: MODES OF ASPHYXIA-TION AND METHODS OF RESUSCITATION, by Y. Henderson; 1938. London: Baillière, Tindall and Cox. Large crown 8vo, pp. 327. Price: 13s. 6d. net.

THE CHEMISTRY OF THE STERIDS, by H. Sobotka; 1938. London: Baillière, Tindall and Cox. Medium 8vo, pp. 647. Price: 38s. net.

GRAY'S ANATOMY, DESCRIPTIVE AND APPLIED, edited by T. B. Johnston, M.D., assisted by J. Whillis, M.D., M.S.; Twenty-seventh Edition; 1938. London: Longmans, Green and Company. Royal 8vo, pp. 1566, with 1336 illustrations, of which 624 are in colour. Price: 45s. net.

Diary for the Month.

- Nov. 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- Nov. 23.—Victorian Branch, B.M.A.: Council.
- Nov. 24.—New South Wales Branch, B.M.A.: Branch.
- Nov. 24.—South Australian Branch, B.M.A.: Branch.
- Nov. 25.—Queensland Branch, B.M.A.: Council.
- Dec. 1.—Western Australian Branch, B.M.A.: Council.
- Dec. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- Dec. 6.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- Dec. 7.—Victorian Branch, B.M.A.: Annual Meeting.
- Dec. 7.—South Australian Branch, B.M.A.: Council.
- Dec. 8.—New South Wales Branch, B.M.A.: Branch.
- Dec. 9.—Queensland Branch, B.M.A.: Annual Meeting.
- Dec. 13.—New South Wales Branch, B.M.A.: Ethics Committee.
- Dec. 14.—Victorian Branch, B.M.A.: Council.
- Dec. 15.—Queensland Branch, B.M.A.: Council.
- Dec. 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

THE following appointments have been made under the recently introduced system of the employment of part-time paid medical officers at hospitals controlled by the Brisbane and South Coast Hospitals Board, Queensland.

Brisbane Hospital.

Senior Physicians: Dr. O. S. Hirschfeld, Dr. Alex. P. Murphy, Dr. D. V. Shell, Dr. C. Sippe.

Junior Physicians: Dr. L. H. Foote, Dr. H. W. Johnson, Dr. O. E. J. Murphy, Dr. D. H. Schafer.

Assistant Physicians: Dr. H. R. Love, Dr. R. J. McAllister.
Senior Surgeons: Dr. C. M. Lilley, Dr. E. S. Meyers, Dr. N. G. Sutton.
Junior Surgeons: Dr. M. Geaney, Dr. K. S. Hirschfeld, Dr. A. E. Lee.
Assistant Surgeons: Dr. M. W. Carseldine, Dr. W. Park, Dr. R. A. M. Yeaton.
Senior Gynaecologists: Dr. H. S. McLelland, Dr. C. A. Thelander.
Junior Gynaecologists: Dr. H. J. Brown, Dr. K. J. G. Wilson.
Senior Orthopaedist: Dr. G. A. C. Douglas.
Senior Urologist: Dr. J. J. Power.
Junior Urologist: Dr. M. G. Sutton.
Assistant Urologist: Dr. F. W. R. Lukin.
Senior Ear, Nose and Throat Surgeons: Dr. W. Crosse, Dr. C. E. Wassell.
Junior Ear, Nose and Throat Surgeons: Dr. F. G. Meade, Dr. A. F. Quayle.
Assistant Ear, Nose and Throat Surgeons: Dr. L. T. Jobbins, Dr. J. W. Ralston.
Senior Ophthalmologists: Dr. E. J. McGuinness, Dr. W. L. Gibson.
Junior Ophthalmologists: Dr. F. G. Scoles, Dr. P. B. English.
Assistant Ophthalmologists: Dr. J. J. Ryan, Dr. G. W. Allan.
Senior Radiologist: Dr. C. Uhr.
Senior Radium Therapist: Dr. V. McDowall.
Senior Psychiatrist: Dr. John Bostock.
Senior Dermatologist: Dr. B. B. Barrack.

Hospital for Sick Children.

Senior Physicians: Dr. S. F. McDonald, Dr. A. E. Paterson.
Junior Physicians: Dr. T. R. Biggs, Dr. C. D. Gillies.
Senior Surgeon: Dr. C. E. Tucker.
Junior Surgeon: Dr. K. B. Fraser.
Assistant Surgeon: Dr. R. Hemsley.
Senior Ear, Nose and Throat Surgeon: Dr. A. S. Clowes.
Junior Ear, Nose and Throat Surgeon: Dr. A. K. Green.
Senior Ophthalmologist: Dr. E. O. Marks.
Senior Orthopaedist: Dr. H. Crawford.

Women's Hospital.

Senior Obstetricians: Dr. J. F. Dunkley, Dr. L. W. Gall, Dr. B. T. Mayes, Dr. K. J. G. Wilson.
Junior Obstetricians: Dr. R. B. Charlton, Dr. M. J. Eakin, Dr. C. F. Marks.
Obstetrician in Charge of Venereal Diseases Clinic: Dr. B. A. Warner.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xx to xxii.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Resident Medical Officers.
COMMONWEALTH OF AUSTRALIA, DEPARTMENT OF THE TREASURY, CANBERRA, FEDERAL CAPITAL TERRITORY: Chief Medical Officer.
FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Junior Resident Medical Officer.
HEATHERTON SANATORIUM, CHELTENHAM, VICTORIA: Assistant Medical Officer.
MARRICKVILLE DISTRICT HOSPITAL, MARRICKVILLE, NEW SOUTH WALES: Junior Resident Medical Officer.
ROCKHAMPTON HOSPITAL, ROCKHAMPTON, QUEENSLAND: Resident Medical Officer.
ROYAL HOBART HOSPITAL, HOBART, TASMANIA: Resident Medical Officer.
THE WESTERN SUBURBS HOSPITAL, CROYDON, NEW SOUTH WALES: Honorary Officers.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, Esplanade, Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 173, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

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All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 3451-3.)

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